

SOME
EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

BY
JOHN FERGUSON, M.A., LL.D..

REGIUS PROFESSOR OF CHEMISTRY IN THE UNIVERSITY OF GLASGOW.

READ TO THE PHILOSOPHICAL SOCIETY OF GLASGOW, JANUARY 6, 1886.

GLASGOW:
PRINTED BY ROBERT ANDERSON, 22 ANN STREET.
1888.

Z
5524
A35F3s

Some early Treatises on Technological Chemistry. By JOHN FERGUSON, M.A., Professor of Chemistry in the University of Glasgow.

[Read before the Society, January 6, 1886.]

§ 1.—During the sixteenth, seventeenth, and eighteenth centuries there was produced a considerable number of books dealing with the marvels of nature, with popular science and medicine, and with practical receipts for domestic and workshop use, which went under the common title of “secrets.” Elsewhere* I have enumerated some 300 of these, which have come under my notice from time to time, and have endeavoured to show that they are possessed of different degrees of merit, both as concerns their contents and themselves. Among them there are upwards of a score which, though published under different names, in different languages, and at different times, exhibit such close relationship to each other that they are obviously variations and extensions of one work. They are practically unknown to bibliographers and to the historians of chemistry, and there is nothing more than a hint existing as to their origin and authorship. Although I have mentioned most of them in the papers referred to, I have not exhausted what may be said about them, and I propose in the following to give a list of them in chronological order, and such descriptions as may exhibit their history and connection with one another. I have tried to make the list as complete as possible, but I do not doubt that there are editions of some of the forms of the collection which have escaped me. If it be so they must be even scarcer than those now described, all of which, the earlier editions especially, have been most difficult to procure for examination.

§ 2.—

1.—1531. Rechter Gebrauch d' | Alchimei, Mitt vil biss her verborgen, nutzbaren vund | lustigen Künsten, Nit allein den fürwitzigen

* In my *Bibliographical Notes on Histories of Inventions and Books of Secrets*, communicated to the Archæological Society of Glasgow, and printed in their *Transactions* for 1883 and 1885. The present notes may be regarded as a supplement to these papers.

Alchimis- | misten (*sic*), Sonder allen kunstbaren Werckleuten, | in
vnd ausserhalb feurs. Auch sunst aller | menglichen inn vil wege
zuge- | brauchen. | ☞ Die Character, Figürliche bedeutungen, vnd
namen der Me | tall, Corpus vnd Spiritus. | ☞ Der Alchimistischen
verlateineten wörter ausslegung. | ☞ Register am folgenden blat. |

Small 4to, ff. xxvii, and one blank. Type of a somewhat florid kind is used for the title-page. Without place and printer's name. The date: M.D.XXXI. is on f. xxvii. verso. There is a vignette of a jeweller's shop on the title. On the reverse of the title are the symbols and names of the metals, &c., a list of certain Latin alchemical words, with their meanings, and the beginning of the table of contents, which ends on the reverse of f. ii. The text begins on f. iii., and runs on to f. xxvii. The first receipt is how to make imitation amber: *Agatsteyn zumachen artlich vnd klar*, and the last to refine gold: *Wie sich das golt gradirt*.

This is the earliest edition of the collection that I have seen, and I judge it to be the first, because I have found no reference to any one before it, and because it contains less matter than any of its successors. The book is not mentioned by any authority except Schmieder,* who says that it was written by George Agricola, the metallurgist, and that it was printed at Cologne, but there is no evidence in support of these statements in the book itself, and both of them are very questionable, if not demonstrably erroneous.

As to the place of printing. Two years later, in 1533, Christian Egenolph, at Frankfurt-am-Main, printed a little tract of 39 leaves, entitled: *Bergwerck vnd Probirbüchlin*, including Gilbertus Cardinal on solution and parting of the metals, to be noticed below in connection with Kertzenmacher. On f. 32 of this tract there is the *identical* woodcut of a jeweller's shop—not a mere copy—which forms the vignette of the present treatise. Further, the *Bergwerck...büchlin* contains woodcuts of a muffle and furnace for assaying which were used over again in 1574, by the heirs of Christian Egenolph, for a book entitled *Probier Büchlein*. Now, in the preface to this latter work, and the head-line of each page, the same florid type is used as in the title-page of the 1531 edition. I have no hesitation in inferring from these coincidences that this first edition was printed by Egenolph at Frankfurt. Later editions (Nos. 7 and 11) were printed by Egenolph and his heirs, as well as an edition of Kertzenmacher, in 1574 (No. 12), which is uniform with the *Probier Büchlein* of the same year, above mentioned, and which contains the same florid type.

* *Geschichte der Alchemie*, Halle, 1832, p. 270.

As to Agricola's authorship. Schmieder states that in his youth Agricola, who from his love of knowledge acquired the name of *Philopeustes*, had pursued alchemy and had written some treatises on it, which were sought for after he had distinguished himself in other ways, and then he gives the names of the said treatises, of which the *Rechter Gebrauch d'Alchimei* is one, and the other is entitled: *Galerazeya sive revelator secretorum*, I. *De lapide philosophico*,....printed, Schmieder says, in 1531 and 1534, dates already given by Dufresnoy (*Histoire de la Philosophie Hermétique*, Paris, 1742, III., p. 82), who has also assigned the *Galerazeya* to George Agricola. Schmieder's account seems to me to be purely imaginative. No one who has written about Agricola has mentioned these treatises, and they are not contained in the collected editions of his works; the *Rechter Gebrauch* was published long before Agricola's best-known works appeared, whereas the *Galerazeya*, at least the copy of it which I have seen, was printed at Cologne in 1631, not 1531. Further, the *Rechter Gebrauch*, as will appear from the abstract following, is a collection of practical receipts, whereas the *Galerazeya* has absolutely nothing to do with alchemy, but is a book of Roman Catholic controversy. The author was a certain *Daniel Agricola*, *Philopistius*, not *Philopeustes*, who lived to the comfortable age of 110 years, and whose whole life, as recorded in the introduction, does not tally at all with that of George Agricola the miner, metallurgist, and geologist. I have no doubt that Schmieder never saw a copy of the *Galerazeya*, but simply followed Dufresnoy. It is not so easy to understand what led him to credit Agricola with the *Rechter Gebrauch*. There is no indication of his being the author that I am aware of, and Schmieder has not noticed that a difficulty arises from the work of Kertzenmacher (which he himself has quoted [p. 280], and which I have included in the present series), having a similar title. Was Kertzenmacher the author of this first edition? In the meantime the author of it is unknown.

The contents of the book itself are entirely practical, and have little or nothing to do with speculative or transcendental alchemy. In this respect it is very remarkable that the author, whoever he was, should have affirmed, in the very title of his work, that the *right use of Alchemy* was not solely to transmute the metals, but to produce, by chemical art, different substances that were in constant demand for every day purposes, and to enable work-people and artists to compass their ends more easily and

successfully. The work is a collection of chemical receipts, which, doubtless, had been long and well-known to alchemists, metallurgists, and others, but which may never have been reduced to a system. Anyhow, the existence of this and the later editions shows that, untrammelled by the unconfirmed theories of the alchemists, there was a desire to turn their incidental discoveries to some useful purpose. Apparently, anything that was worth, any process that would yield a definite result, was taken advantage of, and by degrees came to be widely known, and to form the common property of artists of different kinds, and to be placed in books of receipts and secrets.

A characteristic of this and the other books of the series is the absence of concealment under misleading names of the substances to be used and the processes to be followed. The alchemist was always at great pains to withhold the secrets of his art from those deemed ignorant and unworthy, and he was in the habit of expressing himself in an allegorical and enigmatical style, which is one of the chief obstacles to understanding what the alchemists would be at. In this book, however, there is nothing of the kind, and if there is obscurity occasionally, it is due less to the language employed than to the difficulty of identifying the bodies mentioned, or of seeing precisely what is the drift of the operation described.

This book exhibits very fairly the practical knowledge of chemistry at the beginning of the sixteenth century. Many of the processes seem very roundabout and even absurd now, but then they were the best to be had, and it must be remembered that three and a half centuries have elapsed from the date of the book which records them, centuries filled with research into the causes of the changes which at that time were only slightly known after the most tentative fashion.

The receipts are not arranged in any regular way, but for our present purpose it may suffice to consider very briefly the contents of the book under two main heads: A. substances, and B. processes.

A.—The substances which bulk most largely in the receipts are naturally the metals and some metallic compounds. Gold and silver, mercury, antimony, tin, lead, bismuth, copper and iron are commonly spoken about. Brass was made from copper and calamine, amalgams of gold and silver were familiar, and the solvent power of mercury for these metals was employed for removing them from the others, as well as for getting calx of gold, that is, gold in a fine state of division. The parting of gold

from copper by antimony and by liquation with lead, the cementation and cupellation of gold, the separation of gold by aquafortis were all operations well-known at the time. Other operations were used for silver.

Gilding and silvering were largely practised, and the giving of a yellow and white appearance to other metals without the use of either gold and silver was often employed. But the method of distinguishing between true and imitation gold by streak and aquafortis is described also.

Mercury was much employed for the purposes above mentioned. Cinnabar was made from it artificially by heating it with sulphur; and sublimate is also referred to.

Copper was quite familiar. Besides being gilt, silvered, and tinned, it was converted into verdigris by acetic acid, from which a green colour was obtained; by the action of calamine it was made into brass; it was whitened by treatment with arsenic.

Lead was used in cupellation and liquation; it was converted into white lead by the action of acetic acid, and the process closely resembled that pursued at the present day; red lead was made by heating it in a furnace; and the so-called *lac virginis* was made by digesting litharge got in cupellation with acetic acid.

Tin was used chiefly for coating other metals and for alloying.

Bismuth is mentioned; a fusible alloy was employed for making casts; it was got by melting together lead, tin, and bismuth. This therefore is a very old alloy.

Of the compounds of iron, green vitriol and crocus martis are mentioned, as well as the red solution of ferric acetate.

Antimony is only mentioned in connection with the purification of gold.

White arsenic, orpiment, and realgar, are referred to. Arsenic was used for whitening copper. It was fused with saltpetre, and the residue (consisting mainly of potassic arseniate) was called *fixed arsenic*. A solution called *aqua caustica* was made by boiling together arsenic, realgar, calcined tartar, sal ammoniac, with a ley of ashes and quicklime.

Zinc itself is not alluded to, but *lapis calaminaris* or *galmey*, native carbonate of zinc, and white vitriol are mentioned.

Of the acids, the only two that are distinctly specified are acetic acid and nitric acid. The latter was made by heating together saltpetre, alum, and vitriol.

Though sulphur was much used, there is no reference either to

the acid spirit or acid oil of sulphur—that is, sulphurous or sulphuric acid. Two kinds of oil of sulphur are described, one made by distilling linseed oil with sulphur, the other by digesting sulphur with oil of tartar—that is, with a strong solution of carbonate of potash, but these are oils in a very different sense of the term.

The list of saline substances is comparatively limited. Besides those already quoted, it includes common salt, which was subjected to an elaborate but very imperfect purification; tartar, calcined tartar, ashes, sal alkali, caustic potash, both solid and in solution, made by boiling ashes with quicklime, which in its turn was got by calcining egg shells when wanted particularly pure; sal ammoniac, alum, and an artificial substitute for borax, consisting of carbonate of potash and common salt, or of tartar and common salt.

B.—The processes are of a very rudimentary character, and relate mainly to gilding, silvering, tinning, and calcining the different metals, under which term was included, in pure ignorance of the different results, a good deal more than would be understood now, purification and refining of the metals and alteration of their appearance and properties, the separation or parting of the metals, the rendering of them more malleable, the formation of various solutions or waters as they were called, the preparation and purification of the salts and compounds above mentioned. There are besides some miscellaneous receipts. The very first receipt in the book is to make imitation amber. This was done by boiling turpentine and oil together till thick, stirring well, and pouring into a mould and exposing to the sun for eight days. Out of this could be cut Paternoster beads, knife handles, &c. Another method was to make a mixture of egg yolks, gum arabic, and cherry gum, and allow it to harden in the sun. It became transparent, and “when rubbed, it attracted straws like other amber.” According to another, gems were polished with powdered antimony (that is, the native sulphide) on a leaden sheet. A pyrophorus was made by heating a loadstone with sulphur very slowly up to incandescence, keeping it in that state for three days and nights, and then allowing it to cool. When moistened it burns. Imitation pearls were made from mussel and snail shells, thoroughly clean, powdered in a mortar, washed on a cloth in the sun, dried and calcined. The residue powdered, was added to pure white of egg and thoroughly stirred in, and then moulded “with carefully

washed hands" to the required size, a hole drilled through the pearls while still soft, which were afterwards dried in the sun. They were finally polished in red wine, and fair pearls were thus got. Scented pastilles were made with labdanum, storax, cinnamon, and other odoriferous substances mixed with charcoal powder, the whole converted into a paste with gum tragacanth and water, which was then moulded into pastilles with the hand. *Petroleum* was obtained by soaking bricks or tiles in oil and then distilling at a high temperature. These operations involved furnaces and vessels which are mentioned as things sufficiently well-known, and the operations themselves consisted in digesting with acetic acid and other menstrua, in crystallization, precipitation, sublimation, cupellation, cementation, roasting, fusion.

In no case is there any explanation of a process given—in no case does there appear to have been even a rudimentary conception of the rationale of it. On the contrary, the results were sometimes entirely misunderstood, substances or products were misnamed, and there was no notion of the permanence of the matter operated on, or of the constancy involved in the various changes. There is, for example, a process for "hardening mercury" which, assuming that the substances employed were the same as those denoted by the names now, and so far as the operations are intelligible, could not lead to the result supposed. A small hollow or depression is made in melted lead before it solidifies. Over this a cloth is placed, and then mercury on the cloth, and the whole is set in warm ashes till the "mercury" becomes hard. The "hardened mercury" is broken into pieces and placed in strong "vinegar," or in juice of the plant ox-tongue, vinegar, and oil, and boiled for a quarter of an hour. The "mercury" is mixed with sal ammoniac and vinegar in a luted vessel and left for 8 or 10 days; the "vinegar extracts all the roughness from the mercury;" the "mercury" is transferred to another vessel in a wind furnace, where it is heated gradually to redness till it detonates. The "mercury" is then hung in a pot with sulphur at the bottom of it, and a gentle heat is applied to vaporise the sulphur. This is to be repeated once a day for 30 days. The "mercury" is now removed, and can be hammered and fused. This "mercury," melted with twice its weight of copper, gives a product which behaves to all tests like genuine silver.

So far as one can see, the sole result of this curious operation, lasting five or six weeks, is to yield the lead that was begun with,

or sulphide of lead, while a quantity of mercury is sent up the chimney of the wind furnace.

Time and reiteration were important factors with the early chemists. Here is another example: "To make gold from mercury." A parting water (nitric acid) was made out of vitriol (sulphate of iron), saltpetre, and plumose alum, into which crude mercury was put. The "water" was distilled off and poured back again, or new "water" was added, and the whole was put in a long-necked flask to which a little alembic was well luted, with a receiver, and the water distilled away from the mercury by means of a gentle fire till the mercury became red like blood, and gave no fume when heated, "which will happen in three months" (!). "Test it for two or three months, the mercury will become fixed, reduce it quickly with borax or saltpetre and it will be changed into true gold."

Here, again, there is a consumption of three whole months, an endless amount of labour and expenditure of material to make what appears to be nothing more than red oxide of mercury. As for the transformation into true gold, that may have been due to the mercury containing some gold when used for the operation described, or it may not have been gold at all. It is almost useless to try to determine what the authors of these methods exactly intended, or whether the substances are the same as ours, or whether they were pure or not, or, in short, anything about the details. All the processes are quite empirical, and as the chemical properties of the substances employed were virtually unknown, they must have often neutralised each other's effects instead of contributing to the wished-for result. That, however, was inevitable in the then state of science; rather we may wonder that so much was known as seems to have been the case.

This collection forms the groundwork of the edition of 1537, and is contained in whole or in part in almost every one of the editions.

2.--1532. Kunstbüchlein. Allerley Mackel vnd Flecken aus gewand, Sammt (*sic*), Seiden, etc. zu bringen. Dazu auch wie einem jeglich Gewand seyn verlorne farb wider zu bringen sey, desgl. Garn und Leinwand zu farben etc. Nürnberg. d. Cunigund Hergotin 1532. in-4°. ($\frac{2}{3}$ th. Lempertz.)

This book is quoted by Graesse (*Trésor de Livres Rares*, Dresden, 1863, t. iv., p. 53), but I have not seen it. To judge from the title, it is quite different from No. 1; but it would be

interesting to know if it is the first, or an early edition of the tract with the same title, on the same topic, which is included, along with No. 1, in the 1537 and others of the later editions. That could only be settled by actual comparison of the contents.

It may be mentioned here that Graesse quotes other two tracts entitled *Kunstbuchlin*. One was printed at Erfordt in 1599, the other, compiled by Heinr. Vogtherr, appeared at Strassburg in 1538. These tracts seem to be quite distinct from the series now under consideration. I have not seen them.

3.—1537. *Kunstbüchlin, gerecht- | ten gründtlichen gebrauchs | aller kunstbaren Werekleut. |*

Von { Ertzarbait, inn vnd ausserhalb feürs, auss Alchimistischem |
vnd natijrlichem grund, nemlich,
Härten, Weychen.
Schmeltzen, Schaiden.
Abtreyben, Probiern.
Löten Etzen.
Abformen, Abgiessen &c.
Jede farben zubereiten, erhalten,
bessern vnd widerbringen, als zum
Malen, Schreyben.
Illuminiern, Vergulden.
Sticken, Edelgestain &c.

Alles Jnhalt zu end beygelegten Registerlins.

M.D.XXXVII.

Small 4to, ff. xxxvii., and 1 of index. The vignette contains pictures of the instruments employed in the processes.

Colophon: Getruckt zu Augspurg, durch Heinrich Steyner, | am XVIII. tag Junij, iñ N.D.XXXVII. (*sic*) Jarr.

This book may be divided into two parts. Leaves 16 verso to 37 contain a simple reprint of the whole contents of the edition of 1531, No. 1, about which, therefore, there is nothing more to say. The preceding leaves, however, contain additional receipts, of which the following is a brief abstract:—

Leaves 2-6 are occupied with receipts for working with iron and steel. These metals were tempered by heating with horn shavings, or blood, or leather, the colour of the steel was noted, and degrees of temper were given to different tools by quenching in water, in infusions of plants, in tallow, in oil, in soap, and other substances.

The so-called solders were fusible mixtures of various kinds. One employed for joining iron in the cold was made up of sal ammoniac, common salt, calcined tartar, bell-metal, antimony,

all ground intimately together, and made into a paste with glue. This was heated very slowly to fusion, then, when cold, it was reduced to fine powder. The two pieces of iron, fitting as closely as possible, were fastened to a board, with paper below, the powder was laid on, and moistened with wine, in which *borras* (I presume the artificial mixture already referred to under No. 1) was dissolved; after the ensuing ebullition was over the action was complete, and the superfluous material was rubbed off. Supposing there was an action, it is not easy to see what part the different ingredients took in it. For copper, a solder was made of copper and white arsenic, and brass filings were also used.

Fluxes for ores were made of sandever, ashes, lime, pounded salt, tartar and saltpetre, all powdered together and thrown upon the ore. Another contained sulphur, lead, litharge, saltpetre, salt, sandever, all well powdered and mixed. These mixtures would undoubtedly slag or vitrify when heated.

Etching upon iron and steel was carried out by coating the surface of the object with wax, or with massicot or red lead and oil, cutting the pattern through the film, and then acting on the metal thus exposed with a water containing verdigris, mercury sublimate, vitriol and alum, or laying on mercury sublimate and moistening with strong vinegar. This seems to have been one of the ways for ornamenting armour.

Metal objects received a gold colour by being covered with yellow varnish. Copper was silvered by grinding intimately on a slab tartar, alum, salt, and silver leaf, adding water and dipping the copper in it, and then brushing with a scratch brush. Iron or steel was prepared for gilding by depositing copper on it from a mixture of verdigris and sal ammoniac.

Leaves 6-7 contain the receipts for taking spots and stains out of cloth. The title of this section corresponds exactly with that of the preceding work, No. 2; and I have little doubt that a portion, if not the whole, of that tract is incorporated in the edition of 1537.

The detergent employed was chiefly wood ashes causticized with slaked lime, and in this the stains were steeped and the fabric afterwards thoroughly rinsed with water and hung up in the air to dry. The operator is warned to keep coloured fabrics out of the sun, lest the colours fade; and among the receipts under this division is one for stiffening silk with gum.

The receipts about ink occupy leaves 8-10. The materials used

were nut galls, green vitriol, and gum water; but they were applied in a variety of ways, and, singularly enough, the importance of using proper proportions was insisted on as a preliminary instruction.

Invisible ink was procured by writing with vitriol and then washing with infusion of nut galls. Another plan was to write with white of an egg, wash ink over the whole surface, and then scrape with a knife where the writing was to be read.

Writing was obliterated by washing it with the distillate from a mixture of sal ammoniac and alum.

Leaves 10-16 contain the sections upon colours and their use. The colours were partly vegetable, partly mineral. Thus, a red colour, a lake, was got from Brazil wood, alum, and lime water, gum being added. A bronze colour was made from the same wood with *galitzenstein*, that is, native white vitriol. Yellow was made from saffron, and from the yolk of eggs. Green was obtained from buckthorn and alum; verdigris was used, and also a mixture of indigo and orpiment. What was called Greek green was merely verdigris. Blue colours were got from plants—the juice of elder berries with alum and lime water, of bilberries, of mulberries, and of corn flowers. A mixture of white lead and indigo was also used. The preparation of mosaic gold is given in tolerable detail; the materials employed were sal ammoniac, mercury, conterfey (a fine coloured brass) and sulphur. Another mixture was tin, bismuth, mercury, sal ammoniac, and sulphur. Mosaic silver was merely tin amalgam. An extraordinary method of getting a gold colour was to blow an egg, fill it with mercury rubbed up with egg-yolk, lute the holes and put the egg, along with half-a-dozen others, to be hatched !! At the end of three weeks the colour is ready.

Gold leaf was used. The metal was ground with honey and salt and put in a shell, then it was applied with gum water and burnished with a tooth.

Another way of applying metals was to write with finely powdered crystal or pumice and gum water, then rub on the metal till there was enough, and finally burnish. Several receipts of a similar kind are given.

The next section refers to the dyeing of horn, feathers, bone, parchment, and the methods were the same for all. Feathers, for example, were steeped in alum and then put into the colouring material. Yarn and cloth were dyed in the same way. Thus, to

dye a red, the cloth was limed and then steeped in Brazil-wood and alum; cinnabar also was used and lees of red wine, but no distinction is drawn between mordant and pigment colours.


The preceding, without exhausting the variations in the receipts, will give some notion of the substances employed and the processes pursued. Certain practical results were undoubtedly attained, but at a great expenditure of time and of material, and with an uncertainty inherent in every empirical process, in which what is essential and what non-essential to success are unavoidably confused. These receipts, however, were plainly considered of the very best and most authentic kind, and they are therefore well worth notice and consideration.

- 4.—1538. Kunstbüchlein gerechten gründlichen Gebrauchs aller kunstbaren Werken. Von Ertzarbeyt etc. Härten, Weychen, Löten, Etzen, Abformen, Malen, Schreyben, Luminiren, Sticken etc. Augsp., H. Steyner 1538. in-4°. (38 ff.) Av. fig. en bois. (22 gr. Lempertz.)

This is a second edition of the previous work, No. 3, 1537. The title is taken from Graesse, *Trésor de Livres Rares*, Dresden, 1863, t. iv., p. 53. See also No. 7, 1550. Graesse does not mention the previous edition.

- 5.—1539. Alchimia. Wie man alle farben, wasser, olea, salia vnd alumina, damit man alle corpora, spiritus vnd calces preparirt, sublimirt vnd fixirt, machen sol. Vnd wie mann dise ding nutze, auff das Sol vnd Luna werden mög. Auch vom solhiren vnnnd schaidung aller metal, Polirung aller handt edel gestain, fürtrellichen wassern zum etzen etc. ein kurtzer begriff. Strassb. Cammerlander, 1539. kl. 4. Mit Holzschn. Hlbbldr.

This title is taken from the *Antiquarischer Katalog* of C. H. Beck, Nördlingen, No. 165, 1885. The book itself I have not seen, but to judge from the title it is an early edition, perhaps the first, of the work that bears the name of Petrus Kertzenmacher. See No. 9, 1570; No. 12, 1574; No. 16, 1589; No. 21, 1613; No. 26, 1720, and No. 29.

- 6.—1549. **A** Kunst Boeck. | Nyeulijck | wten Alchemistichschen | gront vergadert, Tracterende | van allen grontlijckē gebruyē- | kinghen der cunsten. Nutlijck | voor allē wereluidē, als Munt | meesterē, Goltwerkerē, schey | deren, Goltsmeden, schilderen | eñ alle ander werchuyde, werē- | kende in stael, Yser, coeper, eñ | alle andere metalen. | **A** Ghecolligeert eñ eensdeels | getraslateert, door Symonem | Andree van Aemstelredam. |  Niemat is hatende de cunst | dan die onwetenen. | 1549 |

16mo. Title, surrounded by a woodcut border with flowers, fruit, musical instruments, male and female *termini*, &c.; on the reverse is a

picture of a chemist in his laboratory. Besides the title-leaf, there are liij numbered leaves, and 5 leaves of contents.

The last leaf contains the device of the publisher: a hooded falcon perched on the branch of a withered tree, with the monogram Ck in the corner, and mottos on three sides.

The colophon is on the reverse of Hiiij :

Geprent toe Campē, in die Broeder | straet by mi Steuen Joessen.
Anno. M.D.LI | Voor Cornelis Karelsen, Woenende tot | Aemstel-
redam by sinte Olifs poorte int guldē | Missael. Voorstaēde op die
Nieuwebrugge | aent Paellhuysken. |

This is a translation into Dutch, with some modifications, of the German edition of 1537. It is divided into six tracts, and this is the first notable difference between the two, though the succession of the receipts is in reality the same. Another important difference is the omission in this edition of the sections referring to inks and colours (Ed. 1537, ff. 8-14), and of certain of the receipts for the tempering of iron, while some new ones have been added. The contents of the tracts are as follows :—

Tract I. treats of “iron, steel, and other materials, and how to harden, soften, and solder them, of etching on the same, of colouring, gilding, and silvering.” It begins: *Om yser hart te maken*, and it corresponds to ff. 2-6 in the 1537 edition, a few of the receipts being omitted, and one or two new ones added.

Tract II. contains receipts for “removing, by means of water or lye, stains or spots from cloth, velvet, silk, or other stuffs, whether of oil, fat, wine, or whatever it be, and that easily and without injury.” This includes ff. 6-7 of the 1537 edition, but a few receipts of the same character are added in the Dutch version. The first receipt is how to restore the colour to cloth: *Om laken sine verloren verwe weder te gheuen*.

Tract III. deals with the “colouring of wool and linen, the making of the colours, the colouring of horn and bone, the softening and moulding of horn.” The first receipt is to dye yarn or linen brown: *Om garen oft lijnwaet bruyn te verwen*; then follow more colour receipts, and those on bone and horn which occupy ff. 15-16 in the 1537 edition. This completes—as above-mentioned—the first section of the 1537 edition, which is succeeded by the reprint of that of 1531. The same thing occurs in the Dutch version, for towards the end of this third tract is found the receipt for “making a clear, fair amber,” *Agatsteen aerdich end: claer te maken*, as it is given in the 1531 edition (f. 3). This third tract contains at the end a few receipts, which do not occur in the

German versions, as to dyeing silk black, which was effected by boiling it for an hour in galls, and then putting it in a black colour made from gall-nuts and copperas, with rye meal, old iron, hammer scales; to dye silk and hoofs red by boiling in alum water, and then with madder; to dye yarn black by boiling pounded galls in water, taking the galls out and adding Roman copperas and a little gum arabic, and then dipping the yarn in the pot. The same mixture diluted with water was used for grey.

Tract IV. "teaches the gilding, silvering, and colouring of copper, iron, &c., how to fuse and cast them and make certain colours." This, which begins with the hardening of mercury, so that it may be hammered, cast, and worked, *Om Mercurium te arbeyden ende harden datmense smeen, gieten ende arbeyden mach*, corresponds with ff. 4-8 in the 1531, and with ff. 17-20 in the 1537 editions. One or two receipts are again added, such as to mend broken glass by a cement of red lead, quicklime, fine dust from a forge, white of egg, laid on with a cloth; to make *lutum sapientie*, a mixture of lime, horse-dung, iron filings, clay, white of egg, and salt water or ox blood. This was used for vessels which had to be heated to a high temperature, or for luting up subliming pots, and for similar purposes.

Tract V. relates "to the parting of gold, silver, copper, &c., and to testing them; useful and profitable for all goldsmiths, merchants, and others concerned therewith," and commences with the separation of gold and silver: *Om Golt te scheyden wt Syluer*, which is done by treating the conjoined metals with aquafortis at a gentle heat as long as bubbles escape. The fluid is poured into a copper dish on which the silver deposits. The gold which remains in the glass is collected and fused. A considerable variety of methods is given, and there are receipts for colouring metals so as to make them look like gold and silver. There is greater divergence from the earlier German editions in this tract than in any of the others, both in the way of addition, omission, and alteration of the order in which the receipts come.

Tract VI. repeats the title of the book, as it is concerned "with certain actions of Alchemistic things, to make gold and silver, and also with all calcinations of the planets [*i.e.*, the metals], to make waters and oils of the same, wherewith to produce wonderful effects." It begins with the making of gold from mercury, and follows almost exactly the order as given in the German editions. This tract is therefore a strict translation

of ff. 13-27 of the 1531, and of ff. 25-37 of the 1537 editions, with transpositions of certain receipts.

Of Andree, or Andriessen, as he is called in the later editions (Nos. 14, 19), I have failed to find any particulars. He has fulfilled his promise, for his miniature collection is mainly a selected translation from the German, which he has supplemented from other sources, or from his own experience. It may be observed, however, that in the receipts which he has translated he has introduced no modification or improvement. Such a thing, if thought of, was either kept as a special secret, or else it was given as a separate receipt or method.

7.—[1550 ?]. Kunstbüchlin, gerech- | ten gründtlichen gebrauchs aller | kunstbaren Wercklent. |

Von { Ertzarbeyt, in vñ ausserhalb feurs, auss Alchimistischem |
vnd natürlichem grund: nemlich,
Härten, Weychen.
Schmeltzen, Scheyden.
Abtreiben, Probirn.
Löten, Etzen.
Abformen, Abgiessen &c.
Jede farben zubereyten, erhalten,
bessern vnd widerbringen: als zum
Malen, Schreiben.
Illuminiren, Vergulden.
Sticken, Edelgesteyn &c.

† Alles Inhalt zu end beigelegten Registerlins.

† Zu Franckfurt am Meyn, bei Christian Egenolph.

Small 4to, ff. 37, and contents [1]. The vignette on the title is the same as that in the edition of 1537. There is no date or colophon.

This book is a word for word reissue of the edition of 1537, No. 3, but it is not nearly so nicely printed. I presume this is the edition referred to by Graesse, who, in a note to the *Kunstbüchlein*, 1538 (No. 4 above), says: "Il y en a une seconde éd. *Freckft. a. M., Chr. Egenolff* (vers 1550). in-4°. (1 th. R. Weigel)." Graesse, so far as I know, is the only writer who alludes to an undated edition of the book.

8.—1563. Ettliche Künste, | auff mancherley weisz Din- | ten vnd aller-
hand Farben zu bereyten. Auch | Gold vnd Sylber, sampt allen
Metallen ausz der | Feder zu schreiben, Mit vil andern nützlichen
künst | lein. Schreibfedern vnd Pergament mit al- | lerley farben zu
ferben. Auch wie man | Schrift vnd gemälde auf Stä- | helene,
Eisene waaffen vñ | dergleichen, etzen sol. | Etliche zugesetzte Kün-
stücklin, vormalis | im druck nie ausgangen. | Allen Schreibern,

Brieffralern, sampt | andern soleher Künsten Liebhabern, gantz |
 lustig vnd fruchtbar zu wissen. | Den Inhalt dises Büchlins, vnd
 was | für künst hierinn begriffen, findest du | anderseits dises Blats. |

Getruckt zu Straszburg bey | Christian

Müller, Im Iar | M. D. LXIII. |

Small Svo, signatures A—C, or ff. 24, not numbered.

This small volume consists of a reprint from the edition of 1537, No. 3, of the sections on inks, colours, etching, and cleaning of silk and other fabrics. To these are added one or two additional methods of making a red colour with Brazil wood, and methods of colouring horn, bone, glass, and a pretty full section on the dyeing of leather.

9.—1570. Alchimia, | Das ist, | Alle Far- | ben, Wasser, O- | lea, Salia,
 vnd | Alvimina, damit mann alle Cor- | pora, Spiritvs vnnnd Cal- | ces
 Prepariert, Sublimiert vnnnd Fi- | xiert, zubereyten. Vnd wie mann
 di- | se ding nütze, auff dasz Sol | vnd Lyra werden | möge. Auch
 von Soluieren vnnnd schey- | dung aller Metall. Polierung allerhandt |
 Edelgestein, fürtrefflichen Wassern zum Etzen, | scheyden vnnnd
 Soluieren. Vnd zuletzt wie die | giftige Dämpff zauerhüten, ein
 kur- | tzer bericht, &c. | Cum Gratia & Priuilegio Imperiali. | Zu
 Franckfort am Meyn. | M. D. LXX. |

Small Svo, ff. 79 (misprinted 77), and a leaf of Contents. There are 9 pages occupied with woodcuts of different kinds of furnaces and distilling apparatus. In the text is a cut (repeated three times) of a man engaged in tending a furnace with a still, and one of a flask (repeated four times). The title is printed in red and black, and on the reverse is a list of Latin chemical words, with their meanings, copied from the 1531 edition.

Colophon :—Zu Franckfort am Meyn, Bey | Christian Egenolffs Erben. |

In this edition the word “Alchimia” is in black and the initial A of “Alle” is in red. This arrangement is reversed in the editions of 1574, 1589, 1613, but is resumed in that of 1720.

This edition is the only one mentioned by the Author of the *Beitrag zur Geschichte der höhern Chemie*, Leipzig, 1785, p. 577; by Gmelin, *Geschichte der Chemie*, Göttingen, 1797, I., p. 293; and by Schmieder, *Geschichte der Alchemie*, Halle, 1832, p. 280. Gmelin and Schmieder, however, have simply quoted the *Beitrag*.

Though I have been unable to compare them, I have no doubt that this is an edition of the book with the same title published in 1539, No. 5. No author's name is given, but there is a preface by a certain “Petrus Kertzenmacher, somewhile burgher at Maintz, a renowned alchemist.” Who Kertzenmacher was does not appear; Schmieder says that he is unknown. I have met

with no notice of him, and the name may be fictitious. In his preface he says that all art is from God, who imparts it to those who desire it of him. Men desire what is most of use to them; they therefore seek out strange crafts, but only for their own advantage, not for God's glory, and thus they but seldom succeed. Among the arts, "Alchimia" is the best and highest, for whoever has it overcomes everything. But it is very obscure, for the old masters of the art would not teach it to their children and friends. Happy, therefore, is he who finds it, for it is not soon found. Labour, however, conquers all things, and if one seeks right arts with diligence and earnestness it will not be in vain. In this art of Alchimia one must know the materials (which Kertzenmacher undertakes to describe), such as cinnabar, ultramarine, verdigris, white lead, green vitriol, alum, white vitriol, tartar, zinc white, calamine, orpiment, arsenicum, sulphur, sal ammoniac, saltpetre, sal alkali, sal preparatum, sal borax, and the seven metals—gold, silver, mercury, iron, tin, lead, and copper. He next points out that certain of the substances are called *bodies*, such as gold and silver, which are fixed when heated; while others are called *spirits*, such as sulphur, mercury, sal ammoniac, and arsenicum, which cannot abide the fire, but fly away. Whoever will have a true knowledge of the art must be able to make the spirits become bodies, so as to remain permanent in the fire. How this is to be done Kertzenmacher promises to teach, and he accordingly divides his treatise into two books, the first descriptive of the materials, the second of their use in transmutation.

To judge from the preface, Kertzenmacher claims—at all events he does not disclaim—the authorship of the work; but when we come to the first book we find it introduced by the following title:—

Rechter gebranch der Alchimei, mit viel biszher verborgen, nutzbaren vnd lustigen Künsten, nit allein den Alchimisten, sonder allen Kunstbaren Werckleuten, auch sonst aller meniglich inn viel wege zugebrauchen.

—which is to all intents identical with that of 1531. Like the title, a considerable portion of the first book is taken from the 1531 edition, but there are some transpositions and variations and a few additions, such as the description of furnaces; while the receipts in the first edition, which were considered as not bearing upon transmutation, have been omitted. Kertzenmacher's work is therefore only a selection from the main series, but as

such I have considered it necessary to include it in the present list, especially as the compiler has seen fit to appropriate the original title. The receipts in this book relate to the substances above enumerated, and include the calcination of the metals, the preparation and purification of some salts, and the making of certain solutions or waters, which have been already alluded to under the first edition, 1531.

Book two deals with what was called transmutation, in reality the formation of white and yellow alloys and amalgams, or, in certain cases, of mixtures containing gold or silver. The few receipts on this subject which are to be found on ff. 17-19 of the 1531 edition are included, but the greater part of the book is either altogether new, or is taken from some other work with which I am unacquainted. The receipts are purely empirical, and much labour and time were spent in repeating over and over again such operations as solution, crystallization, sublimation, with the view of getting the materials into the proper state for the required action. As these operations were performed without any principle, the results expected were never attained at all, or, if they were, the same results could be got at now with vastly greater rapidity and sureness. In the sixteenth century, however, the knowledge was non-existent, and the experimenter could work only according to his lights, as has to be done at the present day.

The concluding operation of this book is the separation of gold and silver. *Aqua fortis* is poured into a glass with a long neck, which is set in ashes over a furnace and heated by a gentle fire. The alloy in small pieces is thrown into the flask, a condenser is adapted to it, and the whole is distilled to dryness. After the flask is cold the gold is found at the bottom, the silver adhering to the flask like crystal. On breaking the glass the two products are kept apart; each is melted with a little borax, and in this way good gold and silver are separated from one another. If all the receipts were as clearly described as this there would be little room for criticism, and considerable cause for surprise and admiration. (Compare No. 6, 1549, Tract V.)

Appended to Kertzenmacher's treatise is a reprint of the tract on the solution and parting of metals by Gilbertus Cardinal; on the polishing of precious stones; on excellent waters for etching, parting, and dissolving; on precautions to be taken against the poisonous vapours of metals. These tracts, so far as I know, first appeared along with the *Bergerck und Prober büchlin*, printed by

Christian Egenolph at Franckfurt in 1533, in square 8vo, of 39 leaves. They are included in all the editions of Kertzenmacher's work subsequently quoted (No. 12, 1574; No. 16, 1589; No. 21, 1613; No. 26, 1720), but they do not form part of the present series of receipt books. The *Bergwerck vnd Probir büchlin*, however, is of special importance, as affording part of the proof that the same Egenolph was the printer of the *Rechter Gebrauch d'Alchimei*, 1531. See No. 1.

10.—1573. In the British Museum there is an edition of the Secrets of Alexis, in French, printed at Paris, in this year, by Hierosme de Marnef and Guillaume Cauellat, in a fat little 16mo of 911 pages, besides a long index of 80 pages. It was edited by Dr. Christophe Landré, who added to the original work of Alexis collections of secrets from other sources. One of these was the *Kunstboeck* of Andriessen, of which a translation in full is contained in pp. 760-846. Like it, the translation is divided into six tracts, which follow in the same order as in the Dutch.

The first tract treats of metals, and begins: *Pour endurcir le fer.*

The second: *Pour rendre à un drap sa couleur perduë.*

The third: *Pour teindre filet ou toille en brun.*

The fourth: *Pour preparer le Mercure.*

The fifth: *Pour separer l'or de l'argent.*

The sixth: *Pour faire or de Mercure*, and it ends: *Pour gradir l'or.*

In this French version there are a few minor differences; but Landré simply incorporated the whole contents of the 1549 edition in his collection of receipts. From the division of the translation into six sections, it must have been made either from the Dutch, or from some other similarly-arranged edition which I have not seen, and not from the German of 1537, which, as has been already pointed out, runs on without any formal sectional arrangement.

The remainder of Landré's work has nothing to do with the present series of receipt-books. For later reprints, see No. 13, 1576; No. 23, 1637; and No. 25, 1691.

11.—1574. Kunstbüchlin, | Gründtlichen | rechten gebranches, | aller
Kunstbaren Werckleut. Von | Ertzarbeyt, iñ vnd ausserhalb Fenwers,
auss | Alchimistischem vñ natürlichen grunde, Nemlich: | Härten,
Weychen, Schmeltzen, Scheiden, Abtrei- | ben, Probirn, Löten,
Etzen, Abformen, Abgiessen, &c. | Jede Farben zubereyten, erhalten,
bessern, vñ wi- | derbringen: Als zum Malen, Schreiben, Illu- |
miniren, Vergulden, Sticken, | Edelgesteyn, &c. |

Alles Innhalt zu endt beygelegten Registers. |

Mit Röm. Key. Maie. Priuilegien. |

1574 |

Franckfort, Bey Chri. Ege. Erben. |

Small 8vo, ff. 84, and Inhalt, ff. [3]. Title red and black. The vignette is a man cutting discs on an anvil with hammer and punch.

Colophon:—

Getruckt zu Franckfort | am Mayn, bey Christian Ege- | nolffs Erben,
In verlegung D. Ada- | mi Loniceri, M. Johannis Cnippij, vnd | Pauli
Steinmeyers, Im jar | nach der Geburt Christi | vnsers Erlösers, |
M. D. LXXIIII.

The title is from a copy in the British Museum [1033, c. 12 (3)]. This is a reprint of the 1537 edition, No. 3.

- 12.—1574. Alchimia, | Das ist, | Alle Far- | ben, Wasser, O- | lea, Salia,
vnnnd | Alvmina, damit man alle Cor- | pora, Spiritvs vnnnd Cal- | ees
Prepariert, Sublimiert vnnnd Fi- | xiert, zubereyten. Vnnnd wie man
di- | se ding nutze, auff das Sol | vnnnd Lvnna werden | möge. | Auch
von Solniern vnnnd schey- | dung aller Metall, Polierung allerhandt |
Edelgestein, fürtrefflichen Wassern zum Etzen, | scheyden vnnnd
Solniern. Vnnnd zuletzt wie die | giftige Dämpff zuuerhüten, ein
kur- | tzer bericht, &c. |

Cum Gratia & Priuilegio Imperiali. !

Getruckt zu Franckfort am Mayn, |

M. D. LXXIIII.

Small 8vo, ff. 79, and Register f. [1]. Title red and black. Woodcuts of stills and furnaces.

Colophon:—

Getruckt zu Franckfurt | am Mayn, bey Christian Ege- | nolffs Erben,
In verlegung D. Adami | Loniceri, M. Johannis Cnippij, vnd Pauli |
Steinmeyers, Im jar nach der | Geburt Christi vnsers | Erlösers, |
M. D. LXXIIII.

The copy of this in the British Museum wants ff. 9-24; that in my own possession is perfect. It is a simple reprint of No. 9, 1570.

A third volume, uniform with this and the preceding, published in the same year, and with the same colophon, is the *Probiar Büchlein auff Goldt, Silber, Ertz vnnnd Methal, mit vil köstlichen Alchimistischen Künsten*. This is the reprint of a treatise with an almost identical title, which appeared without place, date, or printer's name several years earlier. Though this 1574 reprint does not form one of the present series of books, it also is of importance, as furnishing evidence that the first edition of all, that of 1531, was printed by Egenolphi. See No. 1.

- 13.—1576. Les Secrets Dy Seignevr Alexis Piemontois, Divisez En Devx Parties, . . . Avec La Troisieme Partie Des receptes de diuers autheurs, toutes bien expérimentées & aprouuées: . . . Par Christolle Landré, . . .

A Paris, De l'Imprimerie de Hierosme de Marnef, & Guillaume Cauellat, . . . 1576.

32mo, pp. 911 ; Table, signatures MMM—QQQ viii (?)

This is a reprint of No. 10, 1573, and, as in it, pp. 760—846 of Part III. contain the translation of Andriessen's *Kunstboek*. The translation is divided into the six tracts, arranged in the same order as in the earlier edition and in the Dutch.

14.—1581. Een schoon Trac | tact van sommige werkin- | gen der Alchemistische dinghen, om | Gout, siluer te maken, ende oock van alle calcione- | ringhe der Planeten, ende andere Materien | wacteren ende olyen der seuer te macken, | om wonderliken daer mede te wercken. | Noch een Schoon Tractaet | Boecxken, Inholdende van alderley | verwen te maecken, ende ooc hoemen alderleye Ver- | wen wrijuen ende legghen sal, Ende is seer goetd | ende profijtelijken, voor allen Schrijuers Schil- | ders, Conterfeyters, en andere Stoffier- | ders, Oock allen anderen Liefheb- | bers der Consten. Inholdende. | xxxiiij. Capittelen. | Ghecopuleert ende toesaem ghe- | bracht dorch Symon Andriessen, | van Aemstelredam |

Gedruckt toe Reess, By my Deriek | Wijliex van Santen. Anno. 1581. |

Small 8vo, ff. xxviii, numbered ; Tafel, 2 leaves not numbered ; "*Een schoon Tractaet van de Alchemistry*" 2 leaves, not numbered, at the end of which is the Colophon: Gedruckt toe Reess, By my Deriek | Wyliex van Santen. | Anno. 1581. | It is printed in black letter.

This little volume contains two tracts. The first, beginning: "Eerst Goudt wt Mercurio te maecken," and ending: "Hoemen dat Goudt gradiert," corresponds with the sixth and last tract in the edition of 1549, No. 6, and therefore with the last half of the edition of 1531, No. 1, or with leaves 25-37 of the 1537 edition, No. 3. The second tract consists of a series of receipts, dealing chiefly with the preparation of colours for the use "scribes, painters, copyists, decorators, and other lovers of the arts." Though it contains two or three of the receipts on colours which appear in the 1537 edition, No. 3, and in the third tract of that of 1549, No. 6, the order is different, and there are both omissions and large additions. The origin of these receipts I do not know ; they appear for the first time in this edition as forming part of this series of books. They are distinguished from the bulk of the other receipts by the very minutely detailed descriptions and by the precise nature of the preparations, and the directions given show what trouble the old artists took to have their substances in the best possible state. The first receipt is how to make

varnish for scribes. Egg shells, thoroughly clean and dry, were reduced to an impalpable powder by pounding and sifting, and then mixed most intimately with the finest white or yellow frankincense. This, when required, was dusted from a box with small holes, till the material got a smooth surface. Another mixture was oyster shells and rosin intimately mingled. This was cheaper, but it had the disadvantage of being brown. Scribes' chalk was made by pounding the best white dry chalk as fine as possible. White of egg whipt and filtered was mixed with milk, and this in successive portions was added to the chalk and the whole beaten and stirred till a perfectly smooth thin fluid was obtained. This was filtered through bags, and, after the fluid had passed through, the bags and the contents were allowed to dry spontaneously at an airy window for thirteen or fourteen weeks. Red ink, or, rather, a red paint, was made from finely powdered vermilion mixed by an elaborate process with white of egg. This was a general method for the utilisation of natural mineral colours: they were ground and sifted, or elutriated and dried—the operations being repeated as often as was deemed necessary,—and then the colour was used with gum water or white of egg. Green and blue colours from copper and white lead are mentioned.

Vegetable colours were extracted from flowers and from coloured woods, Brazil wood being frequently employed. This was boiled, strained, and treated with alum and lime, or with ammoniacal urine. A "lake" was formed, which was applied with gum water. Different shades were got by varying the proportions, or by mixing the colours.

A few artificial colours were made. Mosaic gold—*Aurum Musicium*—is very carefully described. Tin amalgam was heated with sulphur and sal ammoniac, the product thoroughly ground and used with gum water.

Gold was prepared for gilding by grinding the leaf gently for a long time in successive small quantities with salt and strong gum, made of the purest gum arabic and distilled or rose water. Much trouble was expended in getting the gold into the finest state. Several sections are devoted to the laying on of gold, the gilding of books, the colouring of parchment for receiving gold and silver writing, and other fine arts.

The directions give some insight, though not nearly enough, into the methods and materials of the old illuminators, whose

work seems to-day as brilliant as when it was first executed, and the results they attained show that work which is to be permanent must have much time and thought and labour expended in its production.

- 15.—1583. A profitable boke | declaring dyners approued re- | medies, to take out spottes and staines, in Silkes, | Veluets, Linnen and Woollen | clothes. | With diners colours how to die Vel- | vets and Silkes, Linnen and Woollen, Fustian | and Threde. | Also to dresse Leather, and to co- | lour Felles. How to Gylde, Graue, Sowder, and Ver- | nish. And to harden and make softe | Yron and Steele. | Very necessarie for all men, speciallye for those | which hath or shall haue any doinges therein: with | a perfitte table herevnto, to fynde all | thinges readye, not the like reuealed | in English hereto- | fore. | Taken Ovt Of Dytche, | and englisbed by L. M. |

¶ Imprinted at London by Thomas | Purfoote, and William Pounsonbie. | 1583 |

Small 4to. Title leaf, and pp. 78. Table, pp. [6]. Printed in black letter.

The preceding is from the copy in the British Museum (C. 31, c. 18), and I presume it is the first edition of this translation. It was reprinted in 1596, No. 17, and again in 1605, No. 20, each succeeding edition being inferior to its predecessor. An account of the contents is given under No. 17, 1596.

- 16.—1589. Alchimia, | Das ist, | Alle Far- | ben, Wasser, | Olea, Salia, | vnnnd Alvmina, | damit man alle Corpora, Spiri- | tvs vnnnd Calces Prepariert, | Sublimieret vnnnd Fixiert, zubereyten. | Vnd wie man diese ding nutze, auff | dass Sol vnd Lyua wer- | den möge. | Anch von Soluieren vnnnd | schey- | dung aller Metall, Polierung, allerhandt | Edelgestein, firtrefilichen Wassern zum Etzen, | scheyden vnnnd Soluieren. Vnnnd zuletzt wie die | giftige Dämpff zuverhüten, ein kur- | tzer bericht, &c. | Cum Gratia & Priuilegio Imperiali. |

Getruckt zu Franckfort am Mayn, |

M.D. LXXXIX.

Small 8vo, ff. 79 [1]. Pictures of furnaces, flasks, and other apparatus. The title is printed in red and black.

Colophon:—

Zu Franckfort am Meyn, Bey | Christian Egenolffs Erben. |

This is the fourth issue of Kertzenmacher's book. See Nos. 5, 1539; 9, 1570; 12, 1574; 21, 1613; 26, 1720; and 29.

- 17.—1596. A profitable booke | declaring dyuers approued re- | medies, to take out spotts and staines, | in Silkes, Veluets, Linnen, and | Wollen Clothes. | With diners colours how to die Veluets | and Silkes, Linnen and woollen Fustian | and Threde. | Also to dresse Leather, and to colour Felles. | How to Gild, Graue, Sowder, and

Vernishe. | And to harden and make soft | Yron and Steele. |
 Very necessarie for all men, specially for those | which hath or shall
 haue any doings therein: with | a perfect table hereunto, to find all
 things | readie, not the like reueale in Eng- | lishe heretofore. |
 Taken Ovt Of Dytche, | and Englished by L. M. |

¶ Imprinted at London by Thomas | Purfoot, dwelling in the newe |
 Rents. 1596. |

Small 4to. Title leaf; pp. 78, numbered; Table, pp. 6, not numbered,
 followed by a blank leaf. Printed in black letter, except the title-
 page and the titles of the different receipts.

This edition, which is not in the Museum, is a simple reprint,
 on inferior paper and with less distinct type, of the edition of
 1583, contained in that collection, and already quoted, No. 15.

The treatise falls into two main parts: the first, pp. 1-58,
 contains receipts for taking out stains, for dyeing and colouring,
 and for dressing leather; the second, pp. 55-78, deals with iron
 and steel, etching on metals. gilding, and soldering.

The receipts for removing spots and stains are numerous, but
 they are mere modifications and variations of a general process,
 depending on the fabrics, and in a few instances on the kind of
 stains. Grease spots were removed by ashes, or oil of tartar, or a
 mixture of lime and ashes. "Walkers claye, called Fullars
 earth," is mentioned, and burnt alum mixed with soap. Ink and
 iron spots were treated with the juice of a lemon, or very sour
 orange, or crab apple, or with common salt and juice of an orange,
 or the boiling juice of sorrel. Oily spots in paper were got rid of
 by putting over them a layer of well burnt bone ash and pressing
 between two hard boards for eight-and-forty hours. A way to
 take wax and rosin spots out of cloth was to drop tallow on them,
 and then placing brown paper over the spots, to apply a hot iron
 till the rosin and tallow melted together and were absorbed by the
 paper.

Perfumes for clothes are described; and to keep away moths a
 powder of dried orange peel and elecampane root was recommended.

The receipts for dyeing are similar to those already so often
 quoted. The substances employed were woad, Brazil wood,
 "grening weede," indigo, oak bark, galls, verdigris, copperas, iron
 scales, alum, arsenic, ashes, and a solution of chalk in vinegar
 mixed with alum, which shows at how early a period acetate of
 alumina was in use. A considerable number of shades were
 obtained. All these receipts are very clear and exact. Skins
 were treated with lime and alum, and coloured with copperas,

madder, Brazil wood, and other substances; and a method of gilding leather is also given.

The contents of the second division are metallurgical. Numerous methods are described for softening and hardening iron and steel, some of which are to be found in the 1537 edition, No. 3. There are also receipts for soldering iron, varnishing it, preparing it for gilding, etching upon it. Most of these also have been already met with in the 1537 edition.

This work has been translated from Dutch and not from German; but, if it be not a compilation as well as a translation, I am not acquainted with any edition in either language of which this is an exact transcript. If the two divisions have been taken from different sources, the second would correspond with the first tract in the 1549 edition, No. 6, so far as it goes, for the English version is fuller; but there is nothing in any of the editions to correspond in extent and detail with the first division about cleansing and dyeing.* This confirms me in the belief that the present list does not exhaust all the extant variations of the series.

18.—1596. A | Booke of Secrets: | Shewing diuers waies to make and prepare all | sorts of Inke and Colours: as Blacke, White, | Blew, Greene, Red, Yellow, and other Colours. | Also to write with Gold and Siluer, or any kind of Mettall | out of the Pen: with many other profitable secrets, | as to colour Quils and Parchment of | any colour: and to graue with | strong Water in Steele | and Iron. | Necessarie to be knowne of all Scriueners, Painters, | and others that delight in such Arts. Translated out of | Dutch into English, by W.P. |

Hereunto is annexed a little Treatise, | intituled, Instructions for ordering of Wines: | Shewing how to make Wine, That it may continue | good and faint not, Neither become sower, nor loose colour. And | how you may remedie faint Wine, take away the hoari- | nesse, with other instructions for the pre- | sernation of the same. | Written first in Italian, and now newly translated | into English, by W.P. |

London, | Printed, by Adam Islip for Edward | White, and are to be sold at his shop | at the little North dore of Pouls, | at the signe of the Gun. | 1596.

Small 4to. No pagination, but it contains ff. 19. Black letter.

The title of this rare pamphlet is from a copy in the British Museum. The first tract is a translation of the *Ettliche Künste*, No. 8, 1563, but it includes only the sections relative to inks and colours. Some of the methods for making colours, and all about

* It may be possibly a translation in full of the *Kunstbüchlein* of 1532, No. 2, which I have not seen, or of a Dutch version of it.

cleaning silk and dyeing leather have been omitted. The translator's name was W. Phillip.

The second tract has no connection with the other or with the present series.

19.—1600. Een schoon Trac- | taet van sommige werckingen | der Alchymistische dingen, om Gout, Sil- | ver ende oock van alle calcioneringe der Planeten, | ende andere Materien, Waterē ende Olyen der sel- | ver te maken. Item noch een Tractaet boeckken, | inhoudende van alderley Verwen te maecken, ende | oock hoemen alder leye Verwen wryven en leggen | sal. Ende is seer goet ende profytelijken voor al- | len Schryvers, Schilders, Conterfeyters en | andere Stoffierders. Oock allen Lief- | hebbers der Consten. |

Noch een schoon Konst-boec, seer | nutlick voor allen Werclieden, als Munt- | meesteren, Goudtwerckers, Scheyderen, Goudt- | smeden, Schilderen ende allen Wercklieden, wer- | kende in Stael, Yser, Koper, ende alle ander Meta- | len. Item om alderhande plecken wt te doen. Om | alderhande coleuren te verwen. Van vergul- | dinghe ende versilveringhe. Ende van | werckinge der Alchymistissen | dinghen, etc. | Ghecopuleert ende te samen ghebracht | door Symon Andriessen van | Amstelredam. |

Ghedrukt t'Amstelredam, by Cornelis | Claessz opt Water int Schrijf-hoeck. | Anno 1600. |

Small 8vo. First book, ff. xxvj; Second book, ff. xxvj. Contents, ff. [4]. It is printed in black letter.

This is a conjoined issue of the two preceding Dutch versions and it is in two books. Book I. is a reprint of the 1581 edition, No. 14, and it consists accordingly of two tracts. The first begins: "Eerst om Goudt wt Mercurio te maecken," and ends: "Hoemen dat Gout gradiert," and it is a reprint, therefore, of the sixth tract in the edition of 1549, No. 6. The second tract relates to the making and using of colours, of which, as has been already shown, the first appearance was in the 1581 edition.

The second book has a separate title-page as follows:—

Const-Boeck: | Nieuwlijk wt den | Alchymistischen gront vergadert. | Tracterende van alle grontlijcken | ghebruyckinghe der Consten. | Nutlijk voor allen Wercklieden, als | Muntmeesteren, Goudtwerckers, Scheyderen, | Goudtsmeden, Schilderē ende allen Wercklieden, | werckende in Stael, Yser, Koper ende alle ander | Metalen. Item om alderhande plecken wt te doen. | Om alderhande colueren te verwen. Van ver- | guldinge ende versilveringhe. Ende | van werckinge der Alche- | mistischen dingen, etc. |

Ghecolligeert ende eensdeels ghetranslateert, door | Symonem Andree van Amsterdam. |

Niemandt en haet die Konst, dan | die onwetende. | Ghedrukt, Anno 1600. |

This title is a reprint with two or three additions of that of 1549, No. 6, and this second book contains the first five tracts of that edition, the sixth tract having been put in the preceding book. It is a somewhat curious arrangement, and looks as if the compiler had had both the 1549 and 1581 editions before him, but instead of reprinting the 1549 copy as it stood, and making a seventh tract of the section of receipts about colours from the edition of 1581, printed off first the 1581 copy, and then added the remaining tracts from the earlier edition. The result of course is the same although the arrangement is inverted. This is the last edition in Dutch, so far as I know; if there were any later no mention of them and no examples have come under my notice.

20.—1605. A | Profitable | Booke, declaring diuers approu- | ued Remedies, to take out spots | and staines in Silkes, Veluets, Linnen | and Woollen Clothes: | With diuers Colours how to die | Veluets and Silkes, Linnen and Woollen, | Fustian and Thread: | Also to dresse Leather, and to colour | Felles. How to guild, grane, sowder, and ver- | nish. And to harden and make soft | Yron and Steele. | Verie necessarrie for all men, specially for those | which haue or shall haue any doing therein: with | a perfect Table hereunto, to finde all thinges rea- | die, not the like reuealed in Eng- | lish heretofore. | Taken out of Dutch, and Englished by L.M. |

Imprinted at London by Thomas | Purfoot, dwelling within the new | Rents, in S. Nicholas Shambles. 1605. |

Small 4to. Title leaf, and pp. 78. Table, pp. [6]. Black letter.

The collation is from the copy in the British Museum, C. 31, c. 20.

This is another page for page reprint of No. 15, 1583, but it is as inferior to the 1596 edition as that is to the edition of 1583. The paper is very poor, the printing wretched. Deterioration, however, in the quality of successive reprints of a book seems, from the numerous instances which have come under my notice, to be the rule.

21.—1613. Alchimia, | Das ist, | Alle Farben, | Wasser, Olea, | Salia, vnd Alumina, damit man | alle Corpora, Spiritvs vnd | Calees Präparirt, Sublimirt vnd Fi- | xirt, zubereyten. Vnd wie man diese ding | nutze, auff dass Sol vnd Lv- | na werden möge. | Auch von Solviren vnd Scheidung | aller Metall, Polierung allerhand Edelgestein, für- | trefflichen Wassern zum Etzen, Scheiden vnd Sol- | viren: Vnd zuletzt wie die giftige Dämpff zu- | verhüten, ein kurtzer Bericht, &c. | Cum Gratia & Priuilegio Imp. |

Franckfurt am Mayn, in verlegung Vin- | centii Steinmeyers, Im Jahr | MDCXIII.

Small 8vo, pp. 130; Index [3]; Colophon [1]; 2 blank. The title is printed in red and black, and pp. 7-15 are taken up with pictures of furnaces of various kinds. The colophon runs thus: Gedruckt zu Darmbstat, bey Bal- | thasar Hofmann, in verlegung Vin- | centii Steinmeyers: | Im Jahr MDCXIII. | The device is an altar with fire upon it.

This is another reprint of Kertzenmacher's book, No. 9, 1570. See also No. 26, 1720.

- 22.—1616. Kunstbüchlein | auff mancherley weiss Din- | ten vnd aller handt Farben zu berey- | ten. Auch Goldt vnd Silber, sampt allen | Metallen auss der Federn zu schreiben, mit viel an- | dern nützlichen Künstlein Schreibfedern vnd Per- | gament, mit allerley Farben zu farben. Auch | wie man Schrifft vnd Gemälde auff | Stäglene, Eisene Waffen, | vnd dergleichen | Etzen soll. | Etliche zugesetzte Kunststücklein, vor- | mals indruck nie aussgangen. | Allen Schreibern, Brieffmaleren, | Sampt andern solcher Künsten Lieb- | habern, gantz lüstig vnd frucht- | bar zu wissen. |

Gedruckt zu Cöllen, Bey Peter von | Brachel, vnder der Gilden Wagen | Im Jahr 1616.

16mo, or very small 8vo. Pp. 43. Inhalt, pp. [3]. Title red and black. Pagination very irregular.

Colophon:—

Gedruckt Cöllen bey Peter von | Von (*sic*) Brachel vnder der Gilden | Wagen. Im Jahr 1616. |

There is a copy of this in the British Museum [1037, a. 10 (3)]. It is a reprint of the *Ettliche Künste*, No. 8, 1563, and is therefore composed of excerpts from the 1537 edition. Like the earlier issue of 1563, it contains the section on leather dyeing, but that upon removing spots and stains from silk, &c., is not included.

- 23.—1637. Les Secrets DV Seignevr Alexis Piemontois. Renen, et augmenté d'une infinité de rares Secrets. A Roven, chez Jean Berthelin, dans la Cour du Palais. . M.DC.XXXVII.
Small 8vo, pp. 675; Table, 70.

This is a reprint of Landré's edition of 1573, No. 10, and accordingly it includes (pp. 564-631) the French translation of Andriessen's *Kunsthorck*, divided, as in the previous issues, into six tracts. It is a shabbily got-up book, badly printed on poor paper, and apparently meant for circulation as a chap-book.

- 24.—1687. Kunst-Buchlein, | Oder | Gründlicher Gebrauch von | Etz- Arbeit, in und ansserhalb | Feuers aus Alchymischen | und natürlichen Grunde, | Nehmlich, | Harten, Weichen, Schmelzen, | Scheiden, Abtreiben, Probieren, | Löten, Etzen, Abformen, | Abgiessen, &c. | Wie auch | Jede Farben zubereiten, erhal- | ten, bessern und wieder

bringen : | Als | Zum Mahlen, Schreiben, Illu- | miniren, Vergulden,
Stücken, | Edelgesteinen. | Nebenst beygefügetem Register. |

Frankfurth und Leipzig, | Verlegts Johann Caspar Meyer, | Anno
1687. |

24mo, pp. 203 ; index [9], 4 blank.

This is a reprint, in somewhat modernized language, of the edition of 1537, No. 3. It contains an additional paragraph on preparing a red colour from Brazil wood, corresponding to that in the *Ettliche Künste*, of 1563, No. 8.

25.—1691. In the British Museum there is another edition of the French translation of the *Secrets of Alexis*, printed at Rouen by “Jean-Baptiste Bensongne, rue Ecuycere, vis-à-vis la petite rue (sic) S. Jean, au Soleil Royal. M. DC. XCI.” in 8vo. The translation of Andriessen’s *Kunstboek* is contained in pp. 602-670, divided, as usual, into six tracts. It is a very scurvy volume, inaccurately printed, also in chap-book style, inferior even to the edition of 1637, No. 23.

26.—1720. Des berühmten | Alchimisten, | Petri Kertzenmachers, | Alchimia, | Das ist | Alle Farben, | Wasser, Olea, Salia und | Alumina, | Damit man alle Corpora Spiritus und | Calces præparirt, sublimirt, und fixirt, | zu bereiten, | Und wie man diese Dinge nutze, | Anf dasz Sol und Luna | werden möge, | Auch von Solviren und Scheidung aller | Metall, Polirung allerhand Edelgesteine, fürtrefli- | chen Wassern zum Etzen, Scheiden und | Solviren. | Dem noch beygefüget | Ein kurtzer Bericht, wie die giftigen | Dämpffe zu verhüten. | Anno 1720. |

Small 8vo, pp. [2], 109 ; Index [3]. The title is printed in red and black.

This is a reprint of the edition of 1570, No. 9, and it tallies with those of later dates. The differences are in the insertion of Kertzenmacher’s name in the title-page, and in the omission from this edition of the short explanation of certain Latin technical words which are found in almost every version of these receipt books from that of 1531 downwards. The woodcuts of the different furnaces have also been omitted from the present issue.

27.—(15—?). In the British Museum [1036. a. 10 (4)] there is an earlier edition of the 1616 *Kunstbüchlein*, No. 22, or of the *Ettliche Künste*, No. 8, 1563. It is a small square 16mo, pp. I-XXXV, Inhalt, pp. [2], followed by a blank page. The title-page is wanting, so that I have been unable to ascertain the exact date: the colophon is as follows:—

¶ Gedruckt zu Augspurg durch | Hans Zimmerman. |

This little treatise contains, of course, the receipts on inks, gold and silver illuminating, colours, etching, &c., which are to be found in the 1537 edition.

- 28.— —? In the British Museum [1036. a. 10 (2)] there is an imperfect copy in square 16mo, of some earlier issue of the *Kunstbüchlein*, 1687, No. 24. The title is wanting, as well as about a dozen leaves at the end, so that nothing definite can be said about the date or place of printing. From its appearance, however, it was probably printed early in the 17th century, if not in the 16th. The fragment consists of ff. 2-76, and the contents correspond as far as they go with those in the aforesaid 1687 edition. Practically therefore this is a fragment of another edition of No. 3, 1537.
- 29.—*Sæc. XVII.* In a small 12mo volume I have a MS. on paper, of what is Kertzenmacher's treatise, although that person's name is nowhere mentioned. It contains 118 leaves numbered, and 1 not numbered. Comparison with the edition of 1570 shows that while it corresponds with the contents of that edition, it does not agree with it absolutely word for word. In some places, also, variations on certain of the processes are omitted, but practically the contents of the two volumes are identical. In the MS. version the tract by Gilbertus Cardinal on the solution of the metals is omitted, and instead of it are given a number of other receipts on the preparation of common salt, green and white vitriol, borax, sal ammoniac, tartar, verdigris, on gold, mercury, silver, arsenic, sulphur, marcasite, and other substances, some of which are to be found in the 1537 edition, while others do not occur in the printed copies so far as I have observed. The copyist has evidently thought it desirable to supplement Kertzenmacher's collection.

§ 3.—The results of this bibliographic sketch may now be summarised.

The first edition appeared in 1531. In 1532 was published the book about removing spots and stains from cloth, and these two were conjoined in the 1537 edition, certain other receipts about metals being prefixed. Kertzenmacher, in 1539, made a selection of the receipts specially relating to transmutation as he thought. In the Dutch translation of 1549 the matter was divided into six books; all about inks and colours was omitted; and the sixth book, relating to metallurgy, was enlarged. In the 1581 Dutch reprint of this sixth book a new tract on colours made its first appearance. Lastly, the English translation of 1583 added largely to the parts relating to cleaning and colouring. The remaining editions are either reprints or translations, in whole or in part, of the preceding types.

§ 4.—The mere enumeration, however, of these books, and recapitulation of the notions and methods of a long bygone chemistry which they preserve, would be of small value if some general principle were not illustrated by them as well.

One feature of them, which stands out strongly and strangely,

is their authors' ignorance or quite rudimentary conception of the properties of material objects. Substances were employed for a given purpose, apparently without certainty that they could produce the effect wanted, or, if they did, how the effect was produced. The receipts are empirical, and if they sometimes hit the mark it is more by chance than by good guiding.

That matter could be depended on, that a substance was individualised by its properties, seems hardly to have had any weight with the compilers of these receipts. They appear to have thought that the properties were variable, or could be extracted from a body, and so we meet with such a statement as that *sal ammoniac draws the colour out of copper*. From the way the author puts it, one feels in doubt if he knew the difference between gold and a yellow alloy. He certainly did not know that if gold is got out of mercury or lead, it must be there to begin with, and is not made by the process. There was no idea of combination or of chemical action as involving alteration of properties. Bewildered by changes to which he had no clue, with phenomena passing constantly before him which he could not control or produce at pleasure, the technical chemist fell back upon empirical trial, and so put a stop to progress. For empiricism is due to ignorance of the rationale of a process.

Wherever that ignorance exists a process must be imperfect; what is unessential is as likely to be included as what is indispensable, for there is no certainty about either one or the other. Hence in the receipts there are details which could have no bearing on the result, and operations are repeated with great expenditure of labour, time, and material, which, if they had been understood, would have been finished more speedily and economically.

§ 5.—So it happens that these books and their contents illustrate what I have said in the other paper* about the progress of the arts relying on mere practice, as compared with that based on inquiry into causes. The receipts give us insight partly into the manipulation of the old chemists and partly into the experience of others that they were the best to be got, and that the employment of them constituted the "right use of Alchemy"—something of *practical* use, as we hear about even now, as distinct from the examination of the phenomena and laws of nature. That these

* The paper meant is on *The First History of Chemistry*, read the same evening as the present one, and printed in the *Proceedings* for 1885-86, vol. xvii. See p. 222.

receipts were appreciated is evidenced by the demand for the books and the number of editions of them. Their persistence is one of their characteristics.

But if anything could illustrate the unsatisfactoriness of empirical methods it would be the contents of the books. For these practical receipts never got any further. They were reprinted *word for word* in 1687 as they had been set forth in 1531 and 1537, and in 1720 as in 1539 and 1570; that is, they existed and were repeated without even verbal change for 150 years.* The collections were varied by omissions or additions of receipts; but the retained receipts were not altered or improved. The science of chemistry had, meanwhile, gone past them, and other books, like those of Beguinus, Glaser, Glauber, of Becher and Stahl and Boerhaave, had been published, which threw new light upon chemical processes, and enabled them to be carried on in a more rational way, and, as a natural consequence, with ever so much better results.

If there were not constant evidence of the vitality of error, one might feel offended at what was considered a secret in practical art worth knowing at the beginning of the sixteenth century, being thought of equal value in the eighteenth, and being republished, unchanged, for the benefit of those who cared to use it. In our days a process can hardly continue for even a short time without its undergoing some modification. So widely diffused is the knowledge of natural science, so irresistible is the ambition to discover something unknown, so rapidly do theories change with new facts, so pressing is the demand for the application of discovery to human uses, that it would be impossible merely to reprint any work on pure or applied chemistry, even were it but two or three years old. It is difficult, therefore, to conceive the state of experimental science when a treatise of applied chemistry could still be of use 150 years after its first appearance. Such slow progression is hardly intelligible, unless we remember that there were receipts, trade secrets, jealously guarded, but no real science; no knowledge of the laws of nature which could be applied to make man's existence easier. Society besides had its attention directed in quite different directions, and was not fitted

*They, however, are not the only examples of literary longevity. Even more remarkable cases are described in my *Notes on Books of Secrets*, parts IV. and V., in the *Transactions of the Archaeological Society of Glasgow*.

for the physical amenities of the present time. So far as chemistry was concerned its principles were too narrow and too inaccurate to permit of technical applications of them. The latter had to wait until the science had grown, by slow correction of its errors, to a fuller comprehension of its own scope. The history of technical chemistry shows that the only foundation for progress in practical applications and production lies in scientific investigation and in the employment of principles and laws; not in "rule of thumb," however absolute; not in haphazard discovery, however lucky and brilliant; not in mere practical dexterity, however consummate. Even if an epoch-making discovery be found by random search, its value is not understood until it has been brought under the law of its being. Priestley isolated oxygen, the most important of all bodies; but he was unable to deduce any law or generalisation from it, and to the end of his life he never grasped the significance of his own work; oxygen remained barren in his hands. Prussian blue, discovered by the merest accident, was manufactured empirically with the utmost uncertainty, until Scheele inquired into the cause of the blue colour, and demonstrated what substances are absolutely necessary for its production. Thereafter the manufacturer could proceed with rapidity and certainty. Coal tar, practically produced, was, as an utterly offensive product, practically wasted, until scientific investigation showed practice what can be done with it, what can be made of it. The coal tar industry, in its very widest form, rests on science, not on practice. Had not chemists pursued the examination of the substances in coal tar, merely for the sake of knowing them and without any intention of practical application, the coal tar colours would never have been discovered, and the series of manufactures thereon depending would never have been called into existence. Every industry that has truly progressed has acquired, sooner or later, to a greater or less extent, a scientific foundation. The history of the manufacture of sulphuric acid exhibits the economy of scientific working, as compared with that of mere practice.

No more hampering, no more fatal delusion can exist than that science is inimical to practice—that the manufacturer does not need science. If that has any meaning, it is that the producer on the large scale can get on better in his dealings with matter by ignorance of its laws than by knowledge of them; that he can afford to neglect them on the large scale, while the scientific investigator must obey them implicitly at any cost.

This is self-contradictory, and it is shown to be so by history. No thesis is easier to maintain or easier to illustrate than that the mere manufacturer is at the mercy of him who makes discovery his chief aim, and must follow wherever he leads. If it required anything to show how all-important is science to the progress of technology it would be the contemplation of the first attempts at technical or applied chemistry as recorded in these old books.

Philosophical Society of Glasgow.

1893-94.

SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.
SUPPLEMENT.

BY

JOHN FERGUSON, LL.D., F.R.S.E., F.C.S.,

REGIUS PROFESSOR OF CHEMISTRY IN THE UNIVERSITY OF
GLASGOW, PRESIDENT OF THE SOCIETY.

GLASGOW:

PRINTED BY ROBERT ANDERSON, 22 ANN STREET.



Some Early Treatises on Technological Chemistry. Supplement.

By JOHN FERGUSON, LL.D., F.R.S.E., F.C.S., Regius Professor of Chemistry in the University of Glasgow, President of the Society.

[Read before the Society, May 2, 1894.]

§ 1. How difficult it is to exhaust a subject, or to make sure that nothing has been overlooked, experience has shown me once more.

In 1886 I communicated to the Society a paper describing a series of twenty-eight different books and editions, published between 1531 and 1720, which, though varying in their contents to a considerable extent, revealed an unmistakable connection with one another. For that reason these books were chosen as illustrating the state of technological chemistry, or, as may be said, the chemical processes for the accomplishing of certain practical results, used in the first half of the sixteenth century, the time when the books were first compiled, and for a couple of centuries later.

In the original paper the books were described as being rare. I have found no reason for altering this statement; for, although on the watch for the occurrence of copies of them, and especially of copies that I did not know, I have, during the past eight years, met with only two or three in catalogues, where they have been usually called scarce, and priced accordingly.

Though at the time I did not believe that I had seen all the existing variations and editions (*Proceedings*, Phil. Soc., Glasgow, 1888, Vol. XIX., p. 126, Reprint, p. 25, No. 17), I thought I had exhausted all that were accessible to me. This, however, was an error, for, by following up one of my own references, I should have found the group of editions, the consideration of which has rendered this supplementary notice necessary.

§ 2. In the original paper (*Proceedings*, Vol. XIX., 1888, p. 136, Reprint, p. 12), a Dutch translation of a German version of the receipts was described under No. 6, dated 1549. It was translated by Symon Andree, and published in a tiny volume of 60 leaves. The chief difference between the two versions consists in the German collection running on continuously, whereas in the Dutch the receipts are divided into six sections or tracts. Again, in 1581, under No. 14, an edition in Dutch was described, consisting of a set of receipts in two sections. The first of these agreed with and was a reprint of the sixth tract in the 1549 edition, while the second consisted chiefly of a set of receipts which did not correspond to anything in the 1549 edition. It appeared, therefore, that while the sixth tract had been selected for reprinting, the remaining five had, for some reason or another, been omitted.

No. 19, however, dated 1600, supplied a reprint of the missing sections I.-V. This edition was in two parts; the first being a reprint of the 1581 collection just mentioned, and the second consisting of parts I.-V. of the 1549 edition. At the time, attention was directed to this rather gratuitous transposition of the sections of the original Dutch edition. Although I did not specially refer to the matter, it seemed to me anomalous that a reprint of a book first published in 1549 should be made in 1600 along with a book published in 1581, while in 1581, when an opportunity, or even necessity, for an identical reprint occurred, this was not made; and I thought that there might be a second part of the 1581 edition as there was of the other, although I had missed it. I had no means of settling this conjecture until, on consulting the British Museum Catalogue, I found under Simon Andree what I required.

§ 3. The following, then, is an account of the 1581 reprint of the first five sections of the 1549 *Kunst Boeck*, from the Museum copy, 719. a. 38:—

1.—1581.

CONST BOECK,

: **N**yeulijck wten
Alchemiftichfchen gront ver-
gadert. Tracterende van allen
grondtlijcken ghebruyckinghe
der Conften.

Nutlick voor allen Wercklieden, als
Muntmeesteren, Goudtwerckers, Scheyderen,
Goutfmeden, Schilderen, ende allen Wercklieden
werckende in Stael, Yfer, Koper, ende alle ander
metalen. Item om alderhande plecken wt te doen.

Om alderhande colueren te verwen. Van ver-
guldinche ende verfiluerinche. Ende van
Werckinghe der Alchemiftiffchen
dinghen. &c.

Gecolligiert ende eenfdeels getranf-
lateert, door Symonem Andree van
Aemsterdam.

Niemant en haet die konst, dan
die onwetende.

Gedruckt toe Reefs, By my Derick
Wylicx van Santen. Anno. 1581.

Small 8°. A—D in eights; or ff. xxx [2]. Black letter.

Collation:—Ai f [i] Title, verso blank.

Aij f iir Text begins, and ends Dvj^r., fol. xxx^r.

Dvj^e Die Tafel, ends Dvii^e.

Colophon:

Gedruckt Toe Reefs, By my Derick

Wijlicx van Santen. Anno. 1581.

It is divided into five Tracts:—

The first begins Om yser hardt te maken.

and ends Om alle Instrumenten schoon te houdē.

f. iir to f. viij^e.

The second begins Om laecken fyne verlooren verwe wedder te gheven.

and ends Vlecken van Olye wt perkement.

f. viij^e to f. xj^e.

The third begins Om garen ende lijnwaet bruyt te verwen.

and ends Grau Garen te verwen.

f. xj^e to f. xvj^e.

The fourth begins Mercurium arbeyden ende harden datmen hem
ghieten ende fmeden kan.
and ends Een glas broeck te remedieren. f. xvjr to f. xxijr.

The fifth begins Om gout te scheyden wt Siluer.
and ends Tin te maken dattet miet kraeck.
f. xxijr to f. xxxr.

§ 4. The following is a summary of the Dutch editions, of which I know three:—

- a. The first, printed in 1549 (1551 in the Colophon), contains six tracts corresponding practically with the German of 1537 (see original paper, No. 6).
- b. The second, printed in 1581, is in two parts. One part, entitled *Const Boeck*, just described, contains tracts I.-V. of Andree's 1549 edition. The other part (see original paper, No. 14), entitled *Een Schoon Tractaet*, contains tract VI. of the 1549 edition, and a number of other receipts which do not occur in the earlier versions of the collection.
- c. The third, which appeared in 1600, is merely a reprint of the 1581 edition. In its arrangement, however (see title page under No. 19 of the original paper), the order is inverted, *Een Schoon Tractaet* comes first, and the *Const Boeck* last.

To complete this review, it has still to be decided whether or not there be an earlier edition of the additional receipts—either separate, or conjoined with some other work—than 1581, or whether they first appeared in that year in the volume above mentioned.

§ 5. The editions of this collection of receipts, the recent investigation of which has formed the chief reason for the present supplement, must now be considered.

In the original paper, under the following numbers and dates, viz.:—No. 10, 1573; 13, 1576; 23, 1637; 25, 1691, four editions of the French translation by Dr. Christophe Landré of the *Secrets* of Alexis were described, each of them containing in the third part the receipts of the *Kunst Boeck*, arranged in six tracts as in the Dutch version. Notwithstanding the obvious suggestion supplied by these references to examine other editions of Alexis for the receipts, I did not follow it up, chiefly from not having ready access to the various editions, and from not having made a special examination of the bibliography of that author. Since then, however, the latter difficulty has been at least partly overcome, for having recently investigated all the available editions,

I am in a position to supply this blank in the original paper. Even now, however, I am not confident that the list is complete, because I am not quite certain that I have examined all the editions. It would be out of place to go into the bibliography of Alexis' book here, both because of its extent, and because I mean to treat it in a monograph, in connection with a different branch of the subject of books on receipts and secrets, so that I must confine myself to a bare enumeration of the editions of Alexis which I know contain the *Kunst Boeck* receipts.

§ 6. It may be necessary, however, to premise that Alexis' receipts are arranged in four parts, which, at least in the early editions, appeared separately with different dates, though they were afterwards printed together. The first part is undoubtedly, the second may be by Alexis, the third is a compilation from divers sources, though said to have been made by him. I am entirely doubtful about this, but for the present theme it is only of importance that the compilation was made at all, not that it was made by Alexis. The best evidence that it is not by him is to be found in the fact that this part differs in different versions, in the Italian and French, for example.

So far as I have observed, the *Kunst Boeck* receipts occur only in the third part of Alexis; the other parts, therefore, may be left out of account.

In the original paper, I followed a strictly chronological order, irrespective of language. This was necessary in order to trace the history of the collection in its growth and divergences. On the present occasion, however, as there are no variations to be considered, I shall deal with the successive editions in each language by themselves.

§ 7. Alexis' work was published originally in Italian. The first part was printed in 1555 or 1556, the second at Milan in 1558, the third also at Milan in 1559. I have examined this edition of the third part, and others, dated respectively 1563, 1568, 1595, 1674, but not one of them contains the *Kunst Boeck* receipts. I am inclined to believe, therefore, that these receipts, which, in various forms, passed through so many editions in other languages, were not translated into Italian, and were never included in the Italian editions of Alexis.

§ 8. I pass, therefore, to the French translation, all the copies of which that contain the third part include, as an integral

portion of it, the *Kunst Boeck* receipts. The *Secrets* of Alexis, translated from Italian into French, was first printed at Antwerp by Plantin in 1557. This, of course, contained only the first part in six books. The whole three parts were not printed by Plantin at Antwerp till 1559, in octavo.

- 2.—1559. The third part has the title: *Secrets, ou Receptes Souveraines, bien expérimentées et approuvées par Divers Auteurs*. The different parts are not distinguished as first, second, third, but have separate titles, and this third part is not ascribed to Alexis at all. In this edition the *Kunst Boeck* Receipts are contained, ff. 41-67 verso. The only copy of this edition which I have seen is in the Bibliothèque Ste. Geneviève at Paris.
- 3.—1560. The Lyons edition of this year is entitled *Empirie, et Secrets de S. Alexis* . . . and it was printed by Guillaume Rouille, in 16mo. The third part has this title: *La Troisième Partie des Secrets ou Receptes Souveraines, expérimentées & approuvées par divers Auteurs. Continuant les livres du Seigneur Alexis Piemontoys*. It was printed, however, not by Rouille, but by Thibault Payen, and is dated 1561. It is obvious that this part was thought not to be by Alexis. The *Kunst Boeck* Receipts are contained in this part, pp. 143-240. The copy of this edition is also in the Bibliothèque Ste. Geneviève at Paris.
- 4.—1561. Plantin's third edition of Alexis, Antwerp, in 8vo. Part III. is again distinctly ascribed to different authors, and Alexis' name does not appear. The *Kunst Boeck* Receipts are in Part III. ff. 35 recto to 56 recto. From a copy in my own possession.
- 5.—1564. Rouille, at Lyons, reprinted the edition of 1560 with the same title: *Empirie, et Secrets De S. Alexis* . . . The title of the third part is also a reprint, and the contents are still distinguished from those by Alexis. This is a tidy, clearly printed volume in 16mo. As in the 1560 edition, the Receipts are contained in Part III., pp. 143-240. The third part has Rouille's name on the title-page, but at the end is the colophon:—A Lyon. Par Hygves Barbov. 1565.
- 6.—1564. An edition similar to those of Lyons came out at Paris *chez Hierosme de Marnef, & Guillaume Cauellat*, in 16mo. The book is paged continuously, and there are no separate title-pages. Part III. is described, however, as being by divers authors, in continuation of Alexis. The Receipts are contained pp. 760-846. This edition is in the Bibliothèque Ste. Geneviève at Paris.
- 7.—1573. A similar edition was again printed at Paris by Marnef and Cauellat. This was the earliest edition in French, which I quoted in the original paper. Being acquainted with it, I should have examined the other editions in French. The Receipts occur pp. 760-846. This edition is in the British Museum, 7944. a. 25.

- 8.—1576. A third (?) edition by Marnef and Cauellat was published in the same form. I mentioned it in the original paper under No. 13. The Receipts are contained pp. 760-846. From a copy in my own possession.
- 9.—1578. There was an edition of Alexis published at Lyons in this year by Estienne Michel, in 16°, but, as the contents have been to a certain extent classified, the *Kunst Boeck* Receipts have disappeared as a separate section, and have got scattered among the others. Though the receipts, therefore, may be all present, this can hardly be reckoned as one of the editions of the *Kunst Boeck*.
- 10.—1579. The same may be said of the re-issue of this book in 1579 by Loys Cloquemin, in which the only differences are the title-page, and sheets a and b, which have been re-set. These editions are in the Bibliothèque St. Geneviève.
- 11.—1614. Printed at Rouen, by Robert de Rovves, in 16°. The Receipts occupy pp. 760-846. There is a copy in the Bibliothèque Ste. Geneviève, and one in my own collection.
- 12.—1637. This is a very shabby reprint by Jean Berthelin, at Rouen, in small 8°. The Receipts are in pp. 564-631. This edition will be found in the original paper, No. 23.
- 13.—1642. An edition similar to that of 1637 was printed at Rouen by Martin de la Motte, if, indeed, it be not the same book with a new title-page. As the two copies are in non-lending libraries, it was out of my power to compare them. The Receipts, as before, are in pp. 564-631. The present copy I examined in the Bibliothèque Communale at Amiens.
- 14.—1691. Still another Rouen edition, by Jean-Baptiste Bensongne, in 8vo. This is certainly different from those of 1637 and 1642, as, after an interval of fifty years, it could hardly fail to be. The receipts occupy pp. 602-670. It is in the British Museum, 7321. a a a a. 5.

This is the last of the French editions of Alexis with which I am at present acquainted. It is not impossible that there were other early sixteenth century issues in 16mo at Paris, and in 8° at Rouen during the seventeenth or even eighteenth century, in the degenerate chap-book form in which some of the above mentioned appeared.

§ 9. The same collection of receipts makes its appearance in English in the third part of Alexis. The translation of the first three parts was made by William Warde, and the first editions of each are dated 1558, 1560, and 1562 respectively. The fourth part was by Richard Androse, and appeared in 1569. These first editions are very difficult to get together. Various reprints of the separate parts were made in subsequent years, but in the

latest editions the four parts were printed continuously and uniformly. All the editions are in small quarto, and are printed in black letter. In the title the third part is stated to have been collected by Alexis "out of diuers excellent Authours," which is going a good deal further than the French of 1560 and 1564, and is not justified by facts so far as I am aware.

The following is a list of the editions of the English translation of the *Kunstboeck* as contained in Alexis, Part III. :—

- 15.—1562, by Roulande Hall, for Nycholas Englande. ff. 52 recto, to 79 verso.
- 16.—1566, by Henry Denham, for John Wyght. ff. 50 recto, to 75 verso.
- 17.—1578, by Thomas Dawson, for John Wyght. ff. 50 recto, to 75 verso.
- 18.—1595, by Peter Short, for Thomas Wight. ff. 242 recto, to 267 verso.
- 19.—1615, by William Stansby, for Richard Meighen and Thomas Jones. ff. 242 (misnumbered 250) recto, to 267 verso.

§ 10. The translation, unlike the German of 1537 (original paper, No. 3), but like the Dutch of Andree or Andriessen and the French of Landré, is divided into six tracts, which are titled respectively as follows. I quote the first edition of 1562, and compare it with the Dutch rather than with the German, on account of the division into sections :—

- f. 52 *recto*. Here after folowe manye | goodly receyptes, touchynge the handelynge | of dyuers metalles, all well tryed | and approued. |

This agrees with the first tract in the Dutch of 1549.

- f. 57 *verso*. The | seconde Booke containyng | the maner howe to take oute quickly with water or | lye, without hurtinge any thyng, all maner of | spottes of garments of clothe, veluet, filke, | or other, whether they be spottes of | oyle, greafe, wyne, or what so | euer they be. |

This agrees with the second tract in the Dutch of 1549, except a receipt to stiffen velvet, which has been omitted from the translation.

- f. 60 *recto*. The | thyrde Booke, for to dye | threede, yarne, or linnen cloth, teaching howe to | make the dying colours, and also to dye bones | and hornes, and to make them softe, | vnto what forme and fashion | a man wyll. |

This agrees with the Dutch so far as it goes, but at the end certain receipts which are in the *Kunst Boeck* are omitted. These are: to dye faded silk black; to dye coifs or silk red; to dye yarn "terrat" (which was done by mordanting with alum and then

boiling with the rinds of pomegranates and oranges); to dye yarn black and grey. These extra receipts appear also in the French of 1564, but not in that of 1561, 1576, and 1614, so it would appear as if Warde followed Plantin's French edition, and not the original Dutch.

f. 64 *recto*. The | fourth Booke, teachynge | diuers wayes of gylting, fyluerynge, and di- | ynge copper, iron, and other metalles : | Likewife to forme, melt, and to make | certaine colours. |

In this book, also, there are some receipts omitted which are in the Dutch, but not in Plantin's French edition of 1561: to make moulds for casting; to make cinnabar and azure; to make goldsmith's borax.

f. 68 *recto*. The | fyfte Booke, touchynge | all feparations of gold, of filuer, of copper, and | other metalls, and how a man may try them | and to vse them profitably. Which is a | thing very gainefull for all gold- | fmithes, marchantes, and o- | ther that haue nede | of it. |

In this book there are several omissions from the *Kunst Boeck*: to give tin a golden colour; to cast twelve and nine carat gold; to give weight to gold; to separate silver from slags; to silver copper; to give copper a golden colour; to give copper a golden colour, and to make it draw, hammer, and cast like gold; a red water, which makes objects dipped in it like gold; a strong parting water (nitric acid); water of tartar; to whiten copper.

f. 73 *recto*. The | fyfte Booke, touchyng the | makynge of certayne oyles and waters and o- | ther subftances whiche are of a mer- | ueylous uertue and ope- | ration.

The omitted receipts are these: to make gold out of mercury; brass into gold; to purify gold; to make filver from salamanders; to make crocus martis; to make æs ustum or crocus veneris; coagulation of mercury; to calcine and purify the seven planets (metals), gold, silver, copper, lead, tin, or lead, to calcine tin hard and white, iron, purification of copper, calcination of alum; and, the last receipt of all, to grade gold, or purify it to a very high degree.

So far as I am aware, the above is a complete list of the editions in English.

§ 11. In the original paper there was not included a Danish translation purporting to be from Alexis. There is a copy in the British Museum (441. b. 22 (2)), and I took note of it in connection with that author. But, though nominally by Alexis,

a more careful examination of it, which I have just made, shows that it also belongs to the set of tracts now under consideration. The following is an account of it—

20.—1648.

En liden dog konfterig Bog

Om adskillige flags

F a r f f v e o c B l e c k .

Ilvorledis mand skal farffve Træ,

Been, Jern, Tin, Glas, Byrster, Klæde, Sil-
cke, Skind oc Ledder, faa om atskillige flags Farffve at
berede, at skriffve oc male med.

Alle Skriffvere, Malere, Billed-
huggere, Indleggere, Snedickere, Beendrey-
re, Fellberedere, Farffvere, Skomagere oc an-
dre som til faadant Lyft hafver
til Tieniste.

Paa Tydske Tungemaal først sammenskreff-
ven aff den vjtberömte, velforfarne
mand

A L E X I O P E D E M O N T A N O .

Oc nu meenige Mand til beste oc Tieniste paa
vort Danfke Sprog transferêret, udfat oc til
Trycken forfærdiget.

Prentet i Kiöbenhaffn, Aar 1648.

Aff Peter Hake.

Paa Jörgen Holfis Bogh. Bekostning, oc findis
hos hannem tilkiöbs.

Small 4°. Title; reverse p. 2 and p. 3, verses to the reader. Text, pp. 4-64. Alphabetical Index, pp. [4]. Signatures G to O in fours. P. in two.

Though printed as a distinct tract, the signatures show that it is really a supplement to a tract of the same printer, place and date, entitled :

Öconomia Eller Nödvendige Beretning oc Anledning, hvorledis en gandske Huuszholding paa det nytteligste oc beste (faa fremt Gud allermæctigste giffver sin Velsignelse) kand anstillis.—From the German of Caspar Jugel.

§ 12. On examination, there was little difficulty in ascertaining the sources from which the tract had been taken, and the reason for assigning it to Alexis. It contains, in all, 122 receipts, brought together for the use of a variety of people who employ inks, colours, dyes. The sources are these :—

The receipts from p. 4 down to p. 38 form a translation of Alexis, Part I., Book V., with hardly any variation.

It begins on p. 4 :

- I. En god blaa Farffve at berede, or, in the English version (1568), "To make perfytt asure, such as commeth from beyond the seas;" and ends at the foot of p. 37 : 64. Bleck at giöre Linier med, hvileke mand igien Kand udslette, naar mand hafver skrefven der efter, or, To make incke to rule paper for to write by, wherof the writinge being drie, the lines maye so be taken out, that it shall seeme ye have written without lines; the receipt coming at the top of p. 38. Then follows : 65. At giöre Bleck behendigt oc konsteligt aff mangehaande slags Konster, Skriffvere meget nyttige at vide, which is the beginning of the translation of the *Ettliche Künste* (1563) Receipts.

The last receipt is :

122. Mange haande Farffve, at Farffve Pergament med, corresponding to Mancherley Farben Pergamen zu ferben on Cij *verso* of *Ettliche Künste*.

This Danish translation, therefore, takes up the section on inks and colours which appear in the German *Kunstbüchlin* of 1537 (original paper, No. 3), but which were omitted in the Dutch of 1549 and its reprints, and were printed separately in German in No. 8, *Ettliche Künste*, 1563; No. 22, *Kunstbüchlein*, 1616; and in English, 1596. For these, reference must be made to the original paper.

§ 13. The preceding list shows that, whatever value is to be attached to the practical instructions imparted by this collection of receipts, it was always before the public in German, Dutch, French, English, Danish, and if not in one form, then in another. The *Kunstbüchlin* had a considerable circulation by itself, but it had also the fortune to be associated with the work of Alexis, and it shared in the popularity which that book undoubtedly enjoyed. Perhaps, but for that, it would have been superseded by Alexis' collection. The fact remains, however, that from the year 1531, when the little quarto volume first appeared, down to 1720, which is the latest date I can fix, it went through somewhere about fifty editions. I say somewhere, because it is likely that there are other editions of which I have found no copies, and not even a notice.

The contents of the book must have soaked very thoroughly into the public mind by actual reading and by tradition. The methods which the book contained would be often employed

without the operator knowing where they first came from, or who first described them.

P.S.—In the original paper I have observed certain errors and omissions, which I take this opportunity of correcting:—

Vol. XIX., p. 137 (Reprint p. 12), l. 6, *for* attained, *read* attained to.

„ p. 139 („ p. 14), l. 1, *for* dyeing, *read* dye.

„ p. 144 („ p. 19), l. 12, *for* 80, *read* 81.

„ p. 146 („ p. 21), l. 32, *for use, read use of.*

„ p. 149 („ p. 24), l. 16), *for 55, read 59.*

,, p. 150 (,, p. 25), l. 6 *from bottom, after Museum insert*
(C. 31. c).

„ p. 153 („ p. 28), l. 24, *for* 1037, *read* 1036.

SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

SUPPLEMENT II.

BY
JOHN FERGUSON, LL.D.,

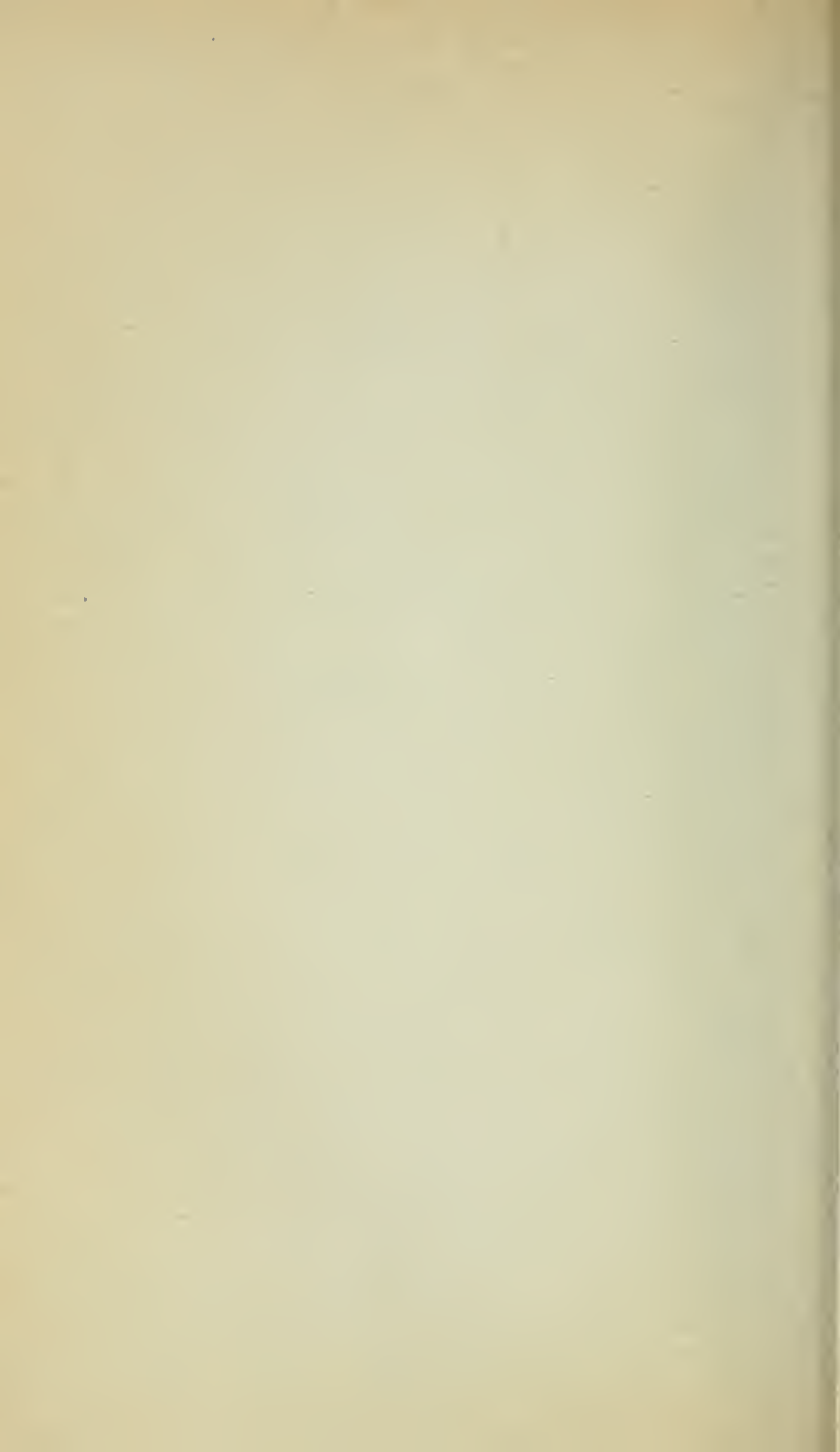
REGIUS PROFESSOR OF CHEMISTRY IN
THE UNIVERSITY OF GLASGOW.

GLASGOW:

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW

BY CARTER & PRATT, LTD., 61-65 CANAL STREET, S.S.

1910.



SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

SUPPLEMENT II.

BY
JOHN FERGUSON, LL.D.,

REGIUS PROFESSOR OF CHEMISTRY IN
THE UNIVERSITY OF GLASGOW.

GLASGOW

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW

BY CARTER & PRATT, LTD., 51-65 CANAL STREET, S.S

1910.

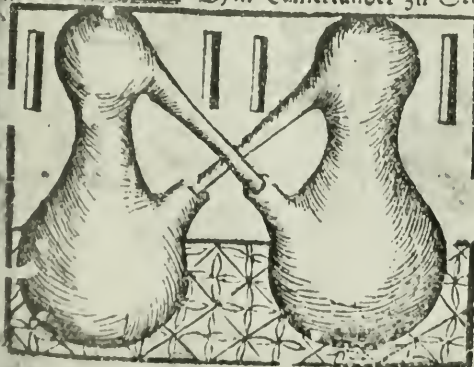
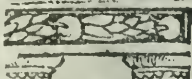


Alchimia.

Wie man alle farben / was-
ser / olea / salia vnd alumina / damit
man alle corpora / spiritus vnd cal-
ces preparirt / sublimirt vnd fixirt/
machen sol. Vnd wie man dise ding
kurze / auff das Sol vnd Luna wer-
den mög. Auch vom soluiren vnd
scheidung aller metal / Polirung al-
ler handt edel gestain / Fürtrefflich-
en wassern züm erzen / scheiden vnd
soluiren / vnd zleyst wie die giffliche
dämpff zü verhüte ein kurzer bgrif.



Vom Camerlander zü Strassburg.



[From the *Proceedings* of the Royal Philosophical Society of Glasgow.]

Some Early Treatises on Technological Chemistry. Supplement
II. By JOHN FERGUSON, M.A., LL.D., Regius Professor of
Chemistry in the University of Glasgow.

[Read before the Society, 15th December, 1909.]

1. It was at a meeting of this Society on January 6, 1886, that I read a paper on the above topic,¹ and to it added a Supplement on May 2, 1894,² the two together containing an account of forty-nine books and editions in various languages: Danish, Dutch, English, French, German, Italian, on the preparation and use of some chemical substances for practical purposes.

The present Supplement is in two parts and deals, first: with an undescribed edition in German, and, secondly: with two or three editions that have to be added to the list of those in English.

2. These books of chemical receipts fall into half-a-dozen or so well marked groups or types, but comparison of their contents shows that they are all more or less closely connected with one another.

3. The earliest form of the collection of receipts appeared in 1531, without the printer's name, and is entitled:—

Rechter Gebrauch d'Alchimei, mit vil bissher verborgenen, nutzbaren
vnd lustigen Künsten,³

In 1539, another collection was printed by Cammerlander, with this title:—

Alchimia, wie man alle farben, wasser, olea, salia vnd alumina, . . .
machen sol.⁴

which, however, has as its sub-title, the title of 1531, and purports

¹ *Proceedings of the Philosophical Society of Glasgow*, 1888, XIX., pp. 126-159.

² *Ibid*, 1894, XXV., pp. 224-235.

³ *Ibid*, 1888, XIX., p. 126.

⁴ *Ibid*, p. 137.

to have been compiled by a certain Petrus Kertzenmacher. This book, as well as that of 1531, ran through several editions, which were enumerated in the 1886 paper referred to above. There the 1531 book was described from an actual copy, but the notice of the 1539 edition of the *Alchimia*, was not taken from the book itself, but was copied from the description in a second-hand book catalogue of C. H. Beck's at Nördlingen, and on the strength of that I inserted it as probably the first edition of Kertzenmacher's work.

4. Since the reading of the first paper four and twenty years ago, I had neither heard nor seen anything of this book, until the summer of the present year, when, happening to visit once more the great Germanic Museum at Nürnberg, I spent some time in the department devoted to Chemistry and Pharmacy. There, while looking at the display of manuscripts, books, prints, portraits and pictures relating to these subjects, I observed a small pamphlet with the title :—

Alchimia, wie man alle farben, wasser, olea, salia vnd alumina, . . .
machen sol.

5. This title was quite familiar to me, though the title-page was not, and, as it had all the look of having been printed in the first half of the sixteenth century, it seemed possible that here at last was a copy of Cammerlander's edition of 1539, or, if not, that it might be a copy of an unknown and undescribed edition, which would be equally interesting and valuable. My curiosity having been aroused, I applied to the Director of the Museum, Dr Von Petzholdt, for permission to examine the book. This was immediately and most courteously granted, and in the Library of the Museum I was able to make a minute inspection of the volume at my leisure. Not only so, but further permission was given me to have the title-page photographed, which was undertaken for me by Mr Christoph Müller, who does the Museum work, and by that means I am enabled to illustrate this paper with a facsimile of the title-page and its curious border.

As I had surmised, the volume proved to be a copy of the 1539 edition of Kertzenmacher's tract, which, so far as I know, is the first of that particular type.

6. An account of the book and a list of its contents will now be given, so as to fill up Beck's description as quoted in my original paper. The title may be transcribed as follows :—

Alchimia.

Wie mann alle farben was-
ser, olea, salia, vnd alumina, damit
mann alle corpora, spiritus vnd cal-
ces preparirt, sublimirt vnd fixirt,
machen sol. Vnd wie man dise ding
nutze, auff das Sol vnd Luna wer-
den mög. Auch vom soluiren vnd
scheidung aller metal, Polirung al-
ler handt edel gestain, Fürtrefflich-
en wassern zum etzen, schaiden vnd
soluiren, vnd zletst wie die giftige
dampff zu verhitē ein kurtzer bgrif.
Bym Camerlander zu Straszburg.

Small 4°. 4 leaves not numbered, the signature, probably A, if there was one, has been torn off; B to M in fours; or ff. [4 not numbered], B to Mj numbered [1] to xlj, [3 leaves not numbered]; so in all there are 48 leaves. There are 30 lines to the page, and the book is printed in bold black letter.

In this copy the numbering of K is in arabic numerals 33·36; all the rest are in roman, but in this copy Kiiij and Lj (that is ff. 36 and xxxvij) are wanting.

On the *verso* of Mj (f. xlj) is the colophon :

Gedruckt zu Straszburg bei M. Jacob Cammerlan- /
dern von Mentz Anno M.D. XXXjX. /

In this copy sheet H seems to be printed on different—apparently thinner—paper, and the edges are uncut while the others are cut.

Collation.

(Aj) The title.

(Aij *recto*) Petrus kärtenmacher / etwan burger zu Mentz, ein berühmter
Al / chemist, wünscht dem Leser alles guts. / ends *verso*, followed
by a woodcut of a "circulatorium," and a jar.

(Aiiij *r.*) Woodcuts: Calcinir offen, Violglass and Circulirglass.

z. Woodcuts: Alembicus rostratus, Circulatorium, Referber offen.
Cucurbita, Pellican.

(Aiiij *r.*) Woodcut of a furnace, a still with alembic and receiver: practically
the Offen, Cucurbita, Alembicus and Violglass combined.

z. Woodcut: Balneum Mariæ.

B j *r.* (f. j) the Text begins :

Rechter gebrauch der Al /
chimei, mit vil bissher verborgnen, nutzaren und lusti /
gen künsten, nit allein den fürwitzigen Alchimisten, sunder /
allen kunstbaren werckleuten, auch sunst aller menigklichen
in vil weg zugebrauchen.

Fiiij *r.* (f. xix *r.*) Vorred in dz ander buch.

On Kiiij or Lj begins the "Bericht" or Gilbertus Cardinalis, but the be-
ginning is unfortunately wanting. It ends on—

Mj *verso* (f. xlj z.) followed by the colophon and a woodcut, already given.

Goldt von kupffer schaiden		xxxiiij.
Golt von vergultem kupffer schaiden		xxxvj.
Jouem calcinirn		xvj.
Koleni verborgne kunst vom goldt machen		xxxiiij.
Lac virginis wasser zemachen		ix.
Lasur j. ij.	Lunam machen	xvij. xliiij.
Martem calcinirn		xvij.
Mercurium congelirn vnd heiten		vij.
Mercurium sublimirn		xj.
Oleum tarari (<i>sic</i>) x.	Oleum bndictum (<i>sic</i>)	x.
Oleum sulphuris x.	Petroleum	x.
		Wij <i>verso</i> .
Pleiweiss		iiij.
Polirung aller handt edel gestain		xxxvij.
Sal commune v.	Salarmoniac	v.
Sal alkali vj.	Salpeter	vij.
Saturnum calcinirn xvj.	Spangrün	ij. iiij.
Semperardes wasser x.	Solem calcinirn	xvj.
Sulphur purgiren und sublimiren		xj.
Solem machen xxiij.	Seyffen goldt	xxxliij.
Sol von luna schaiden xxxv.	Silber soluiren	xxxv.
Silber von schwefel bringen		xxxvj.
Thutiam calciniren iiij.	Venerem calciniren	xliij.
Under welchē planetē ^e gut oder boss in fewr werckē		xxxvij.
Wasser dz alle metal durchschmeltzt in einer stüd		xxxvij.
Wasser sal alkali ix.	Weinstein calcinirn	iiij.
Wie man man (<i>sic</i>) alle metal ^e hammern sol.		xvij.
Wie mann ein dritttagig fewr machen sol.		xx.
Wie man sich hüten sol vor den giftigen bösen dampffen ^e der metal		xxxvij.

• Auslegung etlicher latinischen wörter.

Sol goldt. Luna silber. Mercurius Quecksilber.
Mars eisen. Jupiter zin. Saturnus blei. Venus
Kupffer. Allumen allun. Sulphur schwefel. Aqua
Wasser. Jgnis fewr. Acetum essig. Antimonium
spiess glass. Calx puluer. Calciniren zu puluer machen.
Coagulirn schmeidig machen. Corpus ein jedes metal
oder materi. Soluirn, zertreiben, zerscheyden.
Preparirn bereyten. Purgiren reinigen. Reducirn wi
der bringen.

This list of words is contained in most of the editions.

8. To complete the view of the contents of the treatise and to facilitate comparison of this very rare first edition with those which came after, a list of the chapters under which the subject is comprised may be given.

BOOK I.

Fol.	j r.	Cap.	j.	Wie man Cynober machen sol.
			ij.	Wie man Lasur machen sol.
	r.		iiij.	Lasur zumachen.
	ij r.		iiij.	Eyn ander kunst Lasur zumachen.
	r.		v.	Eyn ander kunst Lasur zu machen.
			vj.	Cynober zu machen.
			vij.	Spangritin zu machen.
	iiij r.		viiij.	Eyn ander ler von Spangritin.
			ix.	Eyn ander ler von Spangritin.
	r.		x.	Wie mann pleiweiss mache.
			xj.	Von den offen.
			xij.	Von dem calcinier offen.
	iiij r.		xiiij.	Vom offen sublimationis.
			xiiij.	Wie man weinstein calcinieren soll.
	r.		xv.	Vom besten atrament.
			xvj.	Wie man eyerschaln calcinieren soll.
			xvij.	Wie man Thutian soll calciniren.
			xviiij.	Wie man Alun calcinieren soll.
	v r.		xjx.	Wie mann sal commune sol machen.
			20.	Vom sal armoniaco.
	vj r.		xxj.	Wie mann sal alkali sol machen.
			xxij.	Wie mann sal borax machen sol.
	r.		xxiiij.	Eyn ander kunst Borax zumachen.
			xxiiij.	Vom goldtschmidt Borax.
	vij r.		25.	Wie mann Salpeter sol machen.
			26.	Von den wassern.
	r.		xxvij.	Wie mann aquam causticam sol machen.
	viiij r.		xxvij.	Wie mann Mercurium congelieren vnd herten sol.
	r.		29.	Wie mann aqua Mercuij sol machen.
	ix r.		xxx.	Von wasser Aquila.
			xxxj.	Wie man das wasser lae virginis sol machen.
	r.		32.	Vom wasser salis alkali.
			33.	Vom wasser crocus Martis.
			34.	Ein apder ler von croco Martis.
	x r.		35.	Vom wasser semper ardens.
	r.		36.	Wie mann oleum Tartari machen sol.
			37.	Wie mann Petroleum mochen (<i>sic</i>) sol.
	xj r.		58 (<i>sic</i> for 38).	Vom oleo benidicto.
			39.	Wie mann oleum sulphuris sol machen.
	r.		40.	Wie mann sulphur purgieren sol.
			41.	Sulphur zu sublimieren.
	xij r.		42.	Wie mann Mercurium sublimieren sol.
	xiiij r.		xliij.	Wie mann alle spiritus fixiren sol.
	r.		44.	[Die sieben Planeten calcinieren, &c.]
	xiiij r.		45.	Wie mann Solem calcinieren soll.

	46.	Wie mann Lunam calcinieren soll.
	47.	Eyn ander calcinatio Solis.
	48.	Eyn ander calcinatio Solis.
Fol. 7 ^r .	49.	Wie man calcem Lune sol preparieren ad calcem Solis.
	50.	Wie mann Venerem soll calcinieren.
xv 7 ^r .	51.	Ein ander kunst Venerem zu calciniren.
	52.	Eyn ander calcinatio Cupri.
7 ^r .	53.	Eyn ander calcinatio Veneris.
xvj 7 ^r .	54.	Eyn ander calcinatio Veneris.
	55.	Wie mann Saturnum calcinieren sol.
7 ^r .	56.	Eyn ander calcinatio Jouis vnd Saturni.
xvij 7 ^r .	57.	Ein ander calcinatio Jouis.
	58.	Wie mann Martem calcinieren sol.
7 ^r .	59.	Eyn ander calcinatio Martis.
	60.	Wie mann alle spiritus wider in jr erste materi bringt.
xviii 7 ^r .	61.	Wie mann alle metalla hammern kan.

BOOK II.

Fol. xix 7 ^r .	Cap. j.	Wie mann Lunam machen sol.
xx 7 ^r .	ij.	Wie man eyn drittagig feur machen sol.
xxj 7 ^r .	iiij.	Ein ander operatio ad Lunam.
xxij 7 ^r .	iiij.	Solem zumachen.
xxiiij 7 ^r .	v.	Eyn bewerte operatio ad Lunam.
xxiiij 7 ^r .	vj.	Eyn ander operatio ad Lunam.
	vij.	Eyn ander operatio ad Lunam.
7 ^r .	viiij.	De Sole bono.
xxv 7 ^r .	ix.	Eyn ander operatio ad solem.
	x.	Eyn ander operatio ad Solem.
xxvj 7 ^r .	xj.	Ad augmentationem Solis.
7 ^r .	xij.	Eyn ander operatio ad Solem.
	xiiij.	Ad Solem.
xxvij 7 ^r .	xiiij.	Eyn gut operatio ad Lunam.
xxx 7 ^r .	xv.	Operatio ad Solem und Lunam.
xxxj 7 ^r .	xvj.	[No title, but apparently the same continued.]
xxxij 7 ^r .	xvij.	Wie mann Solem machen sol.
33 7 ^r .	18.	Von atrimenti (<i>sic</i>).
	19.	Eyn wasser aqua lilij.
7 ^r .	xx.	[Archilaus. Solem machen. Primum—quartum Elixir.]
34 7 ^r .	21.	Kolenus, vom goldt machen.
	22.	Eyn ander operatio ad solem bonum.
35 7 ^r .	Cap. xxiiij.	Seyffen goldt machen.
7 ^r .	24.	Wie mann golt von kupffer schaiden sol.
		[Two leaves are wanting here. In the 1589 edition they contain the following sections ;

	Cap. xxv. Wie man Solem von Luna scheiden soll. Gilberti Cardinalis kunst alle Metall zu soluieren, with a woodcut of a man distilling. Silber zu soluieren. Silber von Schwefel zubringen. Ducaten golt von Pestulatz gülden zumachen. Goldt vom vergülden scheyden.]
Fol. xxxviii r.	Alle metal zu schaiden. Bleych goldt ferben. Alle Ertz flüssig machen. Die Planeten darunder gut oder böss in fewr werken.
z.	Von polirung allerhandt edel gesteyn.
xxxix r.	Eyn starck wasser das eisen schmelzt. Eyn bewert wasser das alle metal durch schmelzt in einer stund.
z.	Eyn wunderbar starck wasser viler krafft. Von den giftigen bösen dampffen vnd rauchen der Metal, wie man sich dabei halten, vnd dero gift vertreiben sol. ein kurtzer bericht an gemeine goldt schmit.
xl. r.	Von dem dampff des Quecksilbers, Bleis, vnd andern metal damit die Goldt schmit gewöhnlich vmb gan.
z.	Wie man den schaden diser dampff sol mindern vnd wenden.

9. The second part of this Supplement contains additions to the list of English editions described in the original paper. The English version may have been made from a Dutch or German original, but possibly it is a collection from several sources, as formerly explained.

10. Besides the editions there described I have found mention made of other three, though it has not been my good fortune to see any of them. The references, however, help to construct what, I should presume, is a complete list so far as it goes, unless there be an edition between 1588 and 1596, which is not impossible.

They may be taken chronologically :

1583. This has been already described.¹

1588.

1596. Already described.²

1600.

1605. Already described.³

1606.

The undescribed editions may now be considered briefly.

11. 1588. The title here given is copied from Andrew Maunsell, and is obviously contracted.⁴

Remedies to take out Spottes and Staines, in Silkes, Veluets, Linnen & Wollen clothes. Also how to Die Silks, Linnen, and Wollen, etc. Also to dresse Leather, & to colour Fells, Howe to Gylde, Graue, Sowder, and Vernishe, and to harden and make soft Iron & Steele, translated by L. M. Prin. by Tho. Purfoote. 1588. 4^o.

This edition is quoted by W. Carew Hazlitt⁵ without detail, as follows, but he does not say where a copy is to be seen.

A profitable booke declaring dyuers approued remedies to take out spottes and staines, in silkes, veluets, &c. Translated out of Dutche. Lond. 1588. 4to.

12. 1600. In the same place Hazlitt quotes an edition of this date :

London Printed by Iohn Wolfe, and are to be sold by Edward White, &c. 1600. 4to. With woodcuts.

If it contain woodcuts it differs from all the editions which I have seen.

13. 1606. For this edition Hazlitt refers to the Harleian Catalogue, but supplies no particulars, and I have seen no other notice of it. As there was an edition of 1605, already described by me, it is not likely that a new one was called for in 1606. It seems more probable that the reverse was the case : that the sale of the book had slackened and that a new dated title-page was inserted to give it a recent look. That however is a mere conjecture.

¹ *Proceedings of the Philosophical Society of Glasgow*, 1888, XIX. p. 148. No. 15.

² *Ibid*, p. 148, No. 17.

³ *Ibid*, p. 152, No. 20.

⁴ Maunsell, *Catalogue of English printed Bookes*, London, 1595, Part II., p. 23.

⁵ *Handbook to the Popular, . . . Literature of Great Britain*, 1807, p. 382.

14. The possibility of the existence of an edition between 1588 and 1596 is based on the interval of four or five years between the other editions, which makes the gap of eight years anomalous. If this were a solitary instance there would be no reason to take notice of it, but there are so many examples of editions of these receipt books being published every four or five years, that, as I have pointed out elsewhere, one may almost calculate on the recurrence of new editions at that interval. So there may have been an edition of this tract about 1592 or 1593.

15. According to most authorities, the translator's initials L. M. stand for Leonard Mascall, whose name I did not know in 1888. There is some diversity of opinion about him, owing to the dates assigned to his works making it difficult to believe that they can be the composition of one person. Leonard Mascall is mentioned as early as 1514; Leonard Mascall was clerk of the kitchen to Matthew Parker, Archbishop of Canterbury in 1573, and his death is placed in 1589. On the other hand a book under his name was published in 1596, and Leonard Mascall is called farrier to King James, which would bring him down to 1604. Pending the solution of the problem of one, or of two, or more Mascalls, it may be stated that a person of the name had the reputation of being skilful in the breeding and treatment of horses, dogs, cattle, sheep, goats, and hogs, skilful too in arboriculture, agriculture, country sports, raising of poultry, fishing, grafting, and practice of medicine, and he published books on these topics. Having given elsewhere some account of Mascall and his books, it is unnecessary to say more about him here.¹

¹ *Transactions of the Glasgow Archaeological Society*, Vol. V. p. 135, and Addenda. (Reprint, 1908, Supplement V. §§ 17-21, and Addenda.)

SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY

SUPPLEMENT III.

BY
JOHN FERGUSON, LL.D.,

REGIUS PROFESSOR OF CHEMISTRY IN
THE UNIVERSITY OF GLASGOW.

GLASGOW:

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW.

BY CARTER & PRATT, LTD., 51-65 CANAL STREET, S.S.

1912.

SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY

SUPPLEMENT III.

BY
JOHN FERGUSON, LL.D.,

REGIUS PROFESSOR OF CHEMISTRY IN
THE UNIVERSITY OF GLASGOW.

GLASGOW:

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW,

BY CARTER & PRATT, LTD., 51-65 CANAL STREET, S.S.

1912.

Artliche kunste mancherley
weyse Dinten vnd aller hand farben zubes
reyten/Auch Goldt vnd Silber sampt al
len Metallen/auß der Feder zu schreyben/
Mit vil andern nützlichen Künstlein / Schreibfedern
vnd Pergamen/allerley Farben zu ferden. Auch
wie man schrifft vñ gemelde auff stäbeline/
cysene waffen/vñ deßgleychen/erzen sol
Allen Schreybern/Brieffmalern/sampt andern
solcher Künsten liebhabern / gang lüstig
vnd fruchtbarlich zu wissen.

IDen inhalt aller Künste dises Büchlins / findet
man in nachuolgender seyten dyses blads/nach
ordnung eins Registers/verzeichnet.

Gedruckt zu Nürenberg durch Simon
Duncfel im W. D. xxxj. Jar.

[From the *Proceedings* of the Royal Philosophical Society of Glasgow.]

Some Early Treatises on Technological Chemistry. Supplement
III. By JOHN FERGUSON, LL.D., Regius Professor of
Chemistry in the University of Glasgow.

[Read before the Society, Wednesday, 29th November, 1911.]

1. Since the last Supplement was submitted to the Society two sessions ago, some more of these treatises have come to light. They happen to be valuable by their supplying dates, as well as the first form of material which was utilized to a greater or less extent in subsequent publications.

One of them I acquired four or five years ago, and it might have been included in the last Supplement. As it happens, however, it goes better with the other two tracts to be described, than with that of Kertzenmacher, which deals with a different branch of the subject.

2. The recent acquisitions may now be discussed in the order of their dates.

FIRST TRACT.

The first tract is concerned with the preparation of inks and colours, and for its identification I have added a facsimile of the title-page, as well as a transcript of it.

So far as I have ascertained there is no copy in the British Museum.

Artliche kunste mancherley
weyse Dinten vnd aller hand Farben zube-
reyten, Auch Goldt vnd Silber sampt al-
len Metallen, ausz der Feder zu schreyben,
Mit vil andern nützlichen Kunstlein, Schreibfedern
vnd Pergamen, allerley Farben zu ferben. Auch
wie man schrifft vñ gemelde auff stabeline,
eysene waffen, vñ deszgleychen, etzen sol
Allen Schreybern, Brieffmalern, sampt andern
solcher Künsten liebhabern, gantz lüstig

vnd fruchtbarlich zu wissen.

¶ Den inhalt aller Künste dis^es Buchlins, findet
man in nachuolgender seyten dys^es blads, nach
ordnung eins Registers, verzeichnet.

Gedruckt zu Nürenberg durch Simon
Dunckel im M.D. xxxj. Jar.

Small 4°. A, B, C in fours, of which Ciiij is blank, or pp. xvij. [2 blank].
30 lines to the page. Two sizes of black letter. Ornamental capitals.
No colophon.

For comparison and reference a transcription of the contents
follows.

¶ Innhalt dis^es Buchlins.

Am iij. iiij. v. vj. wirt beschriben mancherley weys dinten zu
machen.

Am vij. Dinten in der noth. Das die dinten nit verdrücknet
oder eindorret. Das das papier von den motten vnd meüsen nit
gefressen werd.

Am viij. On dinten zu schreyben, das mans nit lese, man ziehs
dañ duch ein wasser. Ein schwartzen brieff mit weysser schrift.
Schrift auff pergamen ausz zuleschen.

Am ix. Von rother farb, vñ wie man presilgen seüt.

Am x. Purpur farb, Rosin farb. Fewer farb. Braün farb.

Am xj. Von galben farben. Auripigmentum, vñnd von grünen
farben.

Am xij. Von grünen farben, vnd safftgrün vber jar zu behalten.

Am xijj. Grünspar zu temperiern. Griechisch grün zu machen,
vnd von blawen farben.

Am xiiij. Lasur zu machen.

Am xv. Von weyssen farben. Kreyden ausz der feddern zu
schreyben. Von golt farben, vnd aurum musicum zu machen.

Am xvj. Argentum musicum. Ein schöne goldtfarb goldt
ausz der federn zu schreyben.

xvij. Alle metal zu schreyben, vñ ein schöne goltfarb.

Am xvijj. Goldt auff papier vnd glasz zu legen.

Am xix. xx. Wie man etzen sol in stahel, schrift vnd gemeldt.

Am xxj. xxij. Federn vnd pergamen mancherley farben zu
ferben.

3. As this table is a mere summary, I have thought it desirable to enumerate the titles of the individual receipts.

Dinten zu machen behend vnnnd künstlich, auff mancherley art vnnnd weyse, den Schreybern fast nützlich zewissen.	p. iij.
Dinten auff Papier.	
Dinten zum Pergamen.	p. iiij.
Ein andere Dinten	
Ein andere auff die weyse, vnd leichter.	p. v.
Ein andere.	
Ein andere.	
Ein andere.	p. vj.
Eyn andere.	
Eyn andere Dinten.	
Behend in der noth dinten zu machen.	
Ein andere in der noth mit geringern kosten.	p. vij.
Dinten zu behalten, das sie nit verdrucknet, auch das sie nit schymlet, vnd die Motten vnnnd Meüss das Papier nicht fressen.	
On dinten zu schreyben, das man nit lesen kan, man zyhe es dann durch eyn wasser	
Ein schwartzen brieff mit weysser schiff zu machen.	p. viij.
Schrift auff pergamen aus zu leschen.	
Ein anders.	
Von Rothen Farben, vnd zum ersten von der Presilgen.	p. ix.
Auff ein ander weyse Presilgen zu sieden.	
Rothe Farb.	p. x.
Purpur Farb.	
Rosin Farb.	
Eyn ander Rosyn farb.	
Fewer Farb.	
Braün Farb.	p. xj.
Von Gelen Farben.	
Ein ander guth Gelb.	
Ein ander Gelb.	
Auripigmentum.	
Grüne Farben.	p. xij.
Safftgrun vbers jar zubehalten.	
Hübsch Grun.	
Blawe Farb.	p. xij.

Lasur zu machen.	p. xiiij.
Lasur zu temperirn.	
Zu schönen blumen.	p. xv.
Von Weyssen Farben.	
Kreyden ausz der Feder zu schreyben auff schwartze tafelin.	
Kalck von eyer schalen wirt also gemacht.	
Eyn güthe Weysse Farb.	
Von Goldt Farben.	
Aurum Musicum.	
Also sol man es temperieren.	p. xvj.
Argentum Musicum.	
Goldtfarb zu schreyben.	p. xvij.
Goldt ausz der feder zu schreyben.	
Von allen Metallen zu schreyben	
Ein gute Goldtfarb.	p. xviiij.
Goldt auff zu legen.	
Goldt auff glas auffzulegen.	
Wie man in Stahel vnd Eysen, schrifft vnd gemalde etzen sol.	
Ein andere art, mit wassern zu etzen.	p. xix.
Eyn anders vnd scherpfffer.	p. xx.
Federn vnd Pergamen, mancherley Farben zuferben.	
Federn grün zuferben.	p. xxj.
Rothe Federn.	p. xxij.
Gele Federn.	
Schwartze Federn.	
Mancherley Farben Pergamen zu ferben.	

4. Where these receipts came from and by whom they were gathered and put in this tract, I do not know. There is no sign of a previous edition in German or other language, so that it may be concluded that this is the first publication of the collection. The receipts were reprinted several times and some of them survived till well on in the eighteenth century, as I shall try to show in a future communication.

5. In my original paper, under No. 27, there was quoted an edition of these receipts on inks and colours in the British Museum

[1036. a. 10. (4.)], which was put down as an earlier edition of the *Ettliche Künste*, 1563, or of the 1616 *Künstbüchlein*. Since acquiring this 1531 edition, I have compared it with that in the Museum, and as the account given in 1886 is meagre, I may extend what was then said about it.

The Museum copy [new press mark, 1036. a. 48] unfortunately wants the title-leaf, so that one can only surmise that, as the book resembles the 1531 edition in other respects, the title will be the same also.

The heading of the book is as follows: it is the same as that of 1531.

Dinten zu mach- | en behend Vnnd Künstlich |
auff mancherley art vnd weyse, |
den Schreybern fast nutz- | lich zu wissen. |

Aj wanting, Aij to Ciiij in eights; or pp. [title-leaf wanting] I-XXXV.
[Inhalt 2, 1 blank]. 24 lines to the page. Two sizes of black letter; ornamental capitals.

Ciiij *recto*, the colophon.

¶ Gedruckt zu Augspurg durch |
Hans Zimmerman. |

The date assigned to this book in the British Museum catalogue is (1620?). It seems to me, however, to be earlier, say about 1540, if that be not before Zimmerman's day.

6. Another point of resemblance between it and the edition of 1531 is the table of contents, which is constructed on exactly the same plan. It is reproduced here for comparison.

Inhalt dises Buchlins.

Am j. ij. iij. iiij. v. vj. vij. wirdt beschreibenn mancherlay weisz dinten zumachen.

vij. ix. x. Dinten inn der not. Das die dinten nit der trucknet oder eindorret.

Das das papir von den motten vnd meijsen nicht gefressenn werd.

On dinten zu schreyben, das mans nit lese, man ziehe ehs dann durch ein wasser.

x. xj. xij. Ein schwartzenn brieff mitt weysser schrift. Schrift auff Pergamen ausz zu leschen. Von roter farb, vnd wie man Presilgen seüdt.

- xiiij. xiiij. xv. Purpur farb. Rosin farb. Fewer farb. Braun farb. Vonn gelen farben.
- xvi. xvij. xviii. Auripigmentum. Vonn gr^eunenn farben, vnd safft gr^eun vber jar zu behaltenn. Indig vnd Auripigmentum zusammen temperiert. Gr^eunspan zu temperirn.
- xix. xx. Griegisch gr^eun zu machenn, vnd von blawen farben.
- xx. xxj. Lasur zu machen. Lasur zu Temperieren.
- xxij. xxiiij. xxiiiij. Von weissen farben. Kreiden ausz der federn zu schreiben.
- Von gold farben, vnd Aurum musicum zu^o machen.
- xxv. xxvj. Argentum musicum. Ain sch^ene Gold farb. Gold ausz der federn zu schreiben. Alle metall zu schreyben.
- xxvij. xxviii. Ain gute gold farb. Gold auff papir vnd glasz zu legen.
- xxviii. xxix. xxx. xxxj. Wie man etzen soll in Stahel, schrifft vnd gemalde.
- xxxij. xxxiiij. xxxiiiij. xxxv. Federen vnnd Pergamen mancherlay farben zu ferben.

This is obviously a reprint of the previous table, and the two editions are practically the same.

7. When the English version of 1596 was formerly described (1886, No. 18), from the copy in the British Museum (C. 31. c. 21), I was unable, of course, to compare it with the German of 1531. I have done so now, and have no doubt that "W. P." made the attempt to turn the contents into English. Comparison of the two books, however, shows differences that may have to be accounted for in more ways than one.

The English translation is a small quarto pamphlet, A to E in fours, without leaf or page numbers. It is in black letter, except the title page, running title, and the headings of chapters, which are in roman. But in the title there are some italics and black-letter as well. The Museum copy wants A₁, either a blank leaf, or containing a large A, with possibly a typographical ornament, or a title slip.

The text of the ink and colour receipts runs from A₃ *recto*, to C₄ *verso*, i.e. 10 leaves.

The second part, from the Italian, containing "Instructions for

ordering Wines," runs from D₁ *recto*, to E₄ *verso*, i.e. 8 leaves. It has no connection with the present series.

These with the missing first leaf and the title-leaf make up the 20 leaves.

8. As this pamphlet is not provided with a table of contents or index, I have thought it necessary to furnish a list of the receipts which have been included in the translation.

And first to make Inke in diuers maners	A ₃ <i>recto</i>
To make Inke to write vpon paper	A ₃ <i>verso</i>
To make Inke for parchement	A ₄ <i>recto</i>
Another sort of Inke	
Another of the same sort, but easie to make	
Another	A ₄ <i>verso</i>
Another	
Another	
Another	B ₁ <i>recto</i>
To make inke vpon a suddaine, to serue in an extremitie	
To keepe Inke that it sinketh not into the paper neither that it come not off, and that moths nor mise hurt not the paper	
To write without inke, that it may not be seen, unlesse the paper be wet with water	B ₁ <i>verso</i>
To take Inke out of paper or parchement	
Otherwise	
Of red colour, and first of Brasill	B ₂ <i>recto</i>
To seeth Brasill another way	
Another red colour	B ₂ <i>verso</i>
Purple colour	
To make Rosin	
Another Rosin	
Fire colour	B ₃ <i>recto</i>
Tawny colour	
Yellow colour	
Another good yellow	
Another yellow	
Otherwise	B ₃ <i>verso</i>
Auripigmentum	
Greene colour	
A faire greene colour	

To temper or prepare Verdigreece	B4 <i>recto</i>
To make good greene	
Blew colour	
To make Azure	B4 <i>verso</i>
To temper or prepare Azure	
A faire blew	C1 <i>recto</i>
White colour	
To make chalke of egshels	
A good white colour	
Gold colours.	
To make Aurum Musicum	C1 <i>verso</i>
Otherwise	
Argentum Musicum	C2 <i>recto</i>
To write a gold colour	
To write with gold out of a pensill	
To write all mettals out of the pen	C2 <i>verso</i>
A good gold colour	
To lay gold vpon anything	
To lay gold vpon glasse	C3 <i>recto</i>
End of the colours.	
How to graue in iron and steel, or in other mettals with strong water	
Another way to graue with water	C3 <i>verso</i>
Another way, but more piercing	
To colour quilts and parchment of diuers colors	C4 <i>recto</i>
To die quilts greene	
Red quilts	C4 <i>verso</i>
Yellow quilts	
Blacke quilts	
To colour parchment and velim of diuers colors	

9. In going over the translation with the original German, I made a few notes which may as well be reproduced. For convenience of comparison the tables of contents given above, §§ 3 and 8, may be used.

German.	English.
p. vj The 2nd receipt is omitted.	A4 <i>v</i>
vij The 1st receipt is omitted.	B1 <i>r</i>
vij 2nd receipt: Dz sie aber nit schymlet werd, so thu ein wenig saltz darein.	

German.		English. B1 v
	Translation: And that it may not come off, put a little salt into it.	
	The German of 1531 means: "in order that it may not grow mouldy, put a little salt in it."	
viii	The 1st receipt is omitted.	B1 v
x	2nd receipt: heydelber (bilberry), is called Heidleber in the English version.	B2 v
	3rd receipt: Rosin Farb (crimson colour) is translated: "To make Rosin."	B2 v
	4th receipt: Eyn ander Rosin Farb is trans- lated: "Another Rosin."	B2 v
	5th receipt: Methwertz is omitted in the translation.	B3 r
xj	„ „ zinoper (cinnabar) is translated "gineper."	B3 r
	1st receipt: The first part is omitted in the English.	B3 r
	3rd receipt: The translation runs: "Take the bark of a tree," instead of "apple-trees."	B3 r
xij	2nd receipt: Sap-green is omitted in the translation.	B3 v
	3rd receipt: To make a fine green: this pas- sage is commented on below § 12. Sections 4, 5, and 7 are omitted but the tempering of verdigris is given.	B3 v B4 r
xijj	1st receipt: To make blue colour. The translation omits holderbern (elderberries) attigbern (dwarf elderberries) heidelbern (bil- berries) and Methwertz.	B4 r
xvj	Lines 16 and 28: Wissmat (bismuth) is translated Tartarum.	C1 v
	Line 8: thus dann in ein glasz mit eyn langen halsz, verkleyb das glas vmbher mit guthen leyden, &c. Translated: "Put it in a glass with a long neck wel stopped	C1 v

German.

English.

with luttum," which is not a rendering of this German. The glass vessel is to be coated with a good lute, so as to protect it when heated in the furnace, and nothing is said about stopping it.

xvij	2nd receipt: 2nd section, Saltzstein (rock-salt) is translated Saltstone.	C2 r
	3rd receipt: the 2nd section is omitted.	C2 r
xviii	2nd receipt: the 1st section is omitted.	C2 r
	4th receipt: about etching on steel; in the 2nd section the directions about linden charcoal are omitted and the use of a paste of red lead and oil, &c., is put after the 3rd section. The fourth is omitted.	C3 r
xxj	1st receipt: 3rd section about colouring red feathers green is omitted.	C4 r

The translation concludes with the colouring of parchment and "velim." The sections about dyeing horn and bone, colouring leather, and a few receipts about taking out spots and stains from velvet, silk and other fabrics, included in the 1563 edition, are omitted.

10. Consideration of these differences—and a closer scrutiny than I have given would doubtless reveal others—raises the question, what was the cause of them?

11. Some of the receipts have been omitted because the translator may have thought duplicates superfluous. Other omissions, however, must be ascribed, I fear, to the translator not being sure of the meaning of the German, at least of some of the technical terms used, or the processes described. Two or three of the examples quoted above (and there are others), show this, I think, pretty clearly. He found it safer, presumably, to omit a receipt altogether, or an ingredient, than to risk an erroneous or unintelligible version.

12. There is another question. What edition did he use?

That it was not that of 1531 is proved, I think, by his version

of the receipts to make a fine green colour. In the edition of 1531, p. xij., the first two receipts are as follows:—

“Nim honig, giesz ein wenig mehr dan des honigs ist essig dran, misch es wol in eym verglasten oder kupfern gefesz, verstopffs oben wol, vñ setz es xij tag vnder einē warmen mysthaußen, oder an ein andre warme stat.

Item, Nachtschatten bletter reyß mit kreyden, vnd sihe zu, das du der kreyden nit zuuul nemest.”

That is :

“Take honey, pour on it a little more vinegar than there is honey, mix it well in a glazed or copper vessel, stop it up well, and set it for twelve days in a warm manure-heap,¹ or some other warm place.

Item, rub leaves of nightshade with chalk, and see that you do not use too much chalk.”

13. Now in the 1537 reprint, these two receipts have been run together, perhaps by a blunder of the copyist or printer. But however it has come about, the result is this:—“Nym honig, geijsz ein wenig mehr dan des honigs ist essig daran, mische es wol in eynem verglasten oder kupffern gefesz, verstopps oben wol, vnd setz es xij tag vndter eyenen mist, sehe zu das du der kreyden nit zeuil nemest.”

Here all about rubbing nightshade leaves with chalk is dropped, and the concluding caution not to use too much chalk is tacked on to the previous receipt, with which it has nothing to do, and thus makes nonsense.

14. The same combination of the two receipts occurs besides in the undated reprint of the 1537 edition (1886, No. 7); *Ettliche Künste*, 1563 (1886, No. 8); *Kunstbüchlin*, 1574 (1886, No. 11); *Kunstbüchlein*, 1616 (1886, No. 22); *Kunst-Büchlein*, 1687, (1886, No. 24); Zimmerman's edition (15—?) (1886 No. 27); and an imperfect copy in the British Museum (with date wanting) (1886, No. 28). Of the 1538 edition I cannot speak, but not one of these has been copied from or compared with the 1531 edition, else the change must have been observed and corrected.

¹ The steady, moderate temperature of a fermenting manure-heap was in constant use by the old chemists for their protracted digestions, when even the gentlest heat of a furnace might have proved too strong, variable and intractable.

15. Curiously enough, however, the Danish translation, 1648, contains the two receipts in their correct form ; p. 52, receipt No. 98.

Høvisk Grønt Farffve.

Tag Honning, oc Adicke lidet meer end Honningen er, formeng det vel udi et Glas eller Kaaberkar, stop det vel til, oc set det 12 Dage udi en Møg haab, eller udi en anden varm sted.

Item, Natskade Blad riff med Krjd, oc see til at du icke tager formeget Krjd.

If this version was not made from the edition of 1531, from what could it have been made?

16. But besides this muddling up of two receipts still another alteration has been introduced in certain of the editions. In that of 1563, for example, no reference is made to a manure-heap at all, and the receipt is as follows :

Nim̃ honig, geisz ein wenig mehr dann des honigs ist, esszig daran, mische es wol in einem verglaszten oder kupffern gsesz, verstopffs oben wol, vnd setz es xij. tag vnder ein haffen, sih zu das du der kreiden mit zuuul nemest.

Here haffen, or hafen, a pot, takes the place of mysthauffen, whether by a misprint or misunderstanding, or as a different reading from an unknown source, I am unable to say.¹

17. Be that as it may, it is this jumbled and altered version which W. P. has used, wherever he got it from, for his translation runs thus :

“Set it [the vessel] twelve daies vnder another pot, and put thereto a little chalk.”

This is not a translation, but is a pathetic attempt on W. P.'s part to extract some sense out of the reference to chalk in the last clause, the connection of which with the rest of the directions he naturally could not make head or tail of, seeing that the original, as it stands, is unintelligible.

I intend to return to the examination of the English translation.

SECOND TRACT.

18. A tract about removing spots and stains, published at Nürnberg in 1532, was quoted by me in the first paper (1886,

¹ The same reading occurs in the edition of Cölln, 1616, and in Zimmermann's, Augsburg, undated. All the rest quoted above (§ 14) use the term “mist” or “myst.”

Allderley Mackel

vnd Fleckē aus gewand

Sammath/Seyden/Guldinen stücken/
Kleydern zc. zu bringen / Es sein Schmalz fleckē

Del oder Wein flecken/oder wie die mügen ge-
nennet werden / Vnd das alles leychtlich
on schaden / mit wassern odder laugen /
wie es dann ynn diesem Büchleyn/
gelen wird / zu volbringen.

Darzu auch wie eynem

yeglichen Gewand / sein verlornē farb
wider zu bringen sey / Deogleychen wis
man Gam vnd Leynwat / auch
holt vñ beyn/ mancherley
farben / färbē sol.

M. D. XXXII.

No. 2) from Graesse, and I have enumerated certain reprints of it, though the 1532 edition itself I have not yet come across. It does not appear in the British Museum Catalogue under "Kunstbüchlein," the first word of the title. Happening, however, to turn, by the merest chance, to the heading "Mackel" in the Catalogue, I found there a treatise on taking out spots and stains, which was new to me. As it appeared obviously to be one of the set, I examined it and made the notes on it which follow. In its case also I have added a facsimile of the title-page, which is not without interest. The press mark of this book is B. M. 7742. aa. 18.

19. [Allerley Mackel] | vnd Fleckē aus gewand
[Sammath, Seyden, Guldinen stucken,
Kleydern &c. zu bringen, Es sein Schmaltz fleckē]
Oel oder Wein flecken, oder wie die mügen ge
nennet werden, Vnd das alles leychtlich
on schaden, mit wassern odder laugen,
wie es dann ynn diesem Buchleyn,
gelert wird, zu volbringen.
[Darzu auch wie eynem]
yeglichen Gewand, sein verlorne farb
wider zu bringen sey, Desgleychen wie
man Garn vnd Leynwat, auch
holtz vñ beyn, mancherley
farben, ferben sol.
[M. D. XXXII.] /

Small 8°. A 8 leaves, B 4 leaves, of which the last is blank; or, pp. [22, 2 blank]. No page or leaf numbers. 25-26 lines. Title red and black, the red portions are here enclosed in the heavy brackets. Three sizes of black letter, an ornamental and also a roman capital N. The colophon is on Biiij *verso*:

Gedruckt yñ der
Churfurstlichē stadt
Zwickaw, durch
Wolffgang
meierpeck

20. Immediately following the title is the table of contents:—

Inhalt dieses buchleins.

Einem yeglichen Gewand sein verlorne farb wider zubringen.
Fleckē vñ mackel aus wullē tuch zubrīgē.

Mackel vñ fleckē aus weissē tuch zubrigē.

Schmaltz odder oel flecken aus weyssem tuch zu bringen.

schmaltz oder ol fleckē aus allerlei tuchē.

Wein flecken aus allē tuchern zubringen.

Flecken aus seydenē schleyern zubringen.

Allerlei mackel aus dē samaht zubringē.

Ein weychen Sammath hart vnd steiff zu machen.

Allerley mackel aus Guldinen stücken zu bringen.

Perlin zu machen die den guten Perlin / gleych sehen.

Garn vnd Leynwath Braun, Blaw, vñ roth zu ferben.

Holtz vñ Beyn allerley farben zu ferben.

Horn weych zu machen.

Horn so weych zu machen das man bildwerck in formē, damit drucken mag.

Horn zu giessen in formen wie bley.

21. The headings of the separate chapters are a little different from the preceding table of contents, and they may therefore be given in detail.

Einem yeglichē gewand sein verlorne farb wider zu bringen. Aij v

Flecken aus dem wullen tuch zu bringen.

Ein Anders.

Aij r

Ein anders.

Aij v

Ein Wasser zumachen, damit man fleckē, aus weissem gewand mag bringē.

Wie man schmaltz oder ol flecken, aus weyssem tuch bringen soll.

Aiiij r

Wie man schmaltz oder ol flecken ausz allerley gewand on aus weissem, vertreyben sol.

Ein anders, Schmalcz flecken zu vortreiben (*sic*).

Aiiij v

Wein flecken aus allerley tuch zu bringen.

Allerley flecken aus seydenen schleyern zu vertreyben.

Allerley mackel vñ flecken aus dem Carmesin Sammat zu bringen.

Av r

Ein Sammath der do weych ist, steiff vnd starck zu machen.

Av v

Ein wasser das alle mackel vnd fleckē aus Guldinen stuckē vñ Sammat hinweg nimpt.

Perlin zu machen die den guten Perlin in aller gestalt gleych sehen.

Avj r

Garn vnd Leynwat Braun zu farben.	Avj v
Garn vnd Leynwat Blaw zu ferben.	Avij r
Ein Blawe farbe, allerley mit zu ferben.	Avij v
Rot zu ferben	
Ein ander Rote farb.	Avijj r
Wie man Holtz Beyn vnd Horn, ferben sol.	Avijj v
Grun zu ferben.	
Ein ander Grun.	Bj r
Ein anders.	
Roth zu ferben.	Bj v
Gehl zu ferben	
Swarcz zu ferben.	Bij r
Horn Weychen.	
Horn so Weych zu machen, das man bildwerck in for- men, damit drucken mag.	Bij v
Ein anders auff die weise.	Bijj r
Horn zu gessen inn formen wie Bley.	Bijj r ends v.

22. These receipts are reprinted in the 1537 *Künstbüchlin* (1886, No. 3), as follows :

Spots and stains (Aij v. to Av v.) are contained in 1537, ff. vi r. to vii v.

Colours and softening of Horn, &c. (Avj v. to the end, Bijj r.) are contained in 1537, ff. xv r. to xvi v.

One receipt, to make pearls, is omitted in the 1537 edition. Another receipt for this purpose is given in it, on f. xvii r., but it is not the same.

Portions are also reprinted in *Mangmeistery* (see § 29), viz :

Spots and stains (Aij v. to Avj v.) are contained in Aijj v. to Bj v. (Cap. ij).

Colours (Avj v. to Avijj r.) are contained in Aij r. to Aijj v. (Cap. j).

The receipts for making Pearls and softening Horn (Bij r. to Bijj r.) are omitted.

23. The question arises as to the connection of this edition with the 4to of the same date printed at Nürnberg (1886, No. 2, 1532), referred to above. Did they come out simultaneously, or did one precede the other, and, if so, which came first? How was it that they appeared in the same year? It is possible, of course, that, though of the same date, one is a mere reprint of the other including the date, and they need not, therefore, have appeared simultaneously ; but, if so, it is not common, when such reprints

exist, to find them of different sizes, and it is more likely that in the present case they were independent publications. As to their contents one can only suppose that they were identical. All such questions and suppositions, however, are just so much futile speculation, and by it one gets no nearer the facts. What is wanted is a copy of the Nürnberg edition for comparison to answer these and other questions that might be asked, but at present I do not know where one is to be seen.

24. When it is considered that the receipts in the 1532 tract are reprinted both in the *Künstbüchlin* of 1537, and the *Mangmeistery* (§ 29), but that those on making pearls and softening horn are omitted from the latter, it may be asked further what edition did the compilers use, and does their use throw any light on the contents of the two issues respectively?

If the Nürnberg edition, like that of Zwickau, contain these receipts, then either may have been employed for the 1537 collection. But, if it do not contain them, it may have served for the reprint in the *Mangmeistery*. At the same time, the editor of the latter, whatever original he copied, may have deliberately left out those receipts as not bearing on his special subject.

There is another possibility, that an edition exists without those receipts, and that it was the model of the *Mangmeistery* reprint. That, however, is improbable, and it is impossible to say anything definite and useful about a book that one has not examined.

THIRD TRACT.

25. Some six months ago I chanced to see in a foreign catalogue a pamphlet, which I judged by its title must belong to this research on chemical receipts, and after capturing it I found my anticipations confirmed. It was not, however, a mere reprint, but a new member of the series, differing in parts from those already described. Of one section, indeed, it is the oldest form I have as yet perused, but whether it is the original, or a reprint from a still earlier edition, or a translation (as might be surmised), I am unable at present to decide.

26. The title of the tract is as follows. Its appearance with the vignette may be judged of by the facsimile.

Mangmeistery.

Von mancherlei farben auff garn, leinwadt, holtz, beyn, leder, &c. Auch wie man ein jeglichen ge-

Wangneistern.

Von mancherley farben auff garn/lein/
wadt holz/beyn/leder ꝛc. Auch wie man ein jeglichen ge-
wande sein verloren farb wider bringen, soll. Item schmalz /öl flecken/
oder was nur für flecken seind / auß gewand / Sammat / sei-
den / gülden stücken / Fleideren ꝛc. Leichtlich mit was-
sern oder laugen / darzu bereit / on schaden
zū vertreiben. Gold vnd silber
farben / auff ein jedes me-
tal mancherley wei-
se / ein kurtze an-
zeigung.



Gedruckt zu Straßburg durch W. Jacob Camerlander.

wandt sein verloren farb wider bringen soll. Item schmaltz, ölflecken,
oder was nur für flecken seind, ausz gewand, Sammat, sei
den, gülden stücken, kleideren, &c. Leichtlich mit was
sern oder laugen, darzu bereit, on schaden
zuvertreiben. Gold vnd silber
farben, auff ein jedes me
tal mancherley wei
se, ein kurtze an
zeigung.
[Vignette.]

Getruckt zu Strassburg durch M. Jacob Cammerlander.

Small 4°. Signatures A to C in fours, or [12 leaves]. No leaf or page numbers, no head lines. No date.

The vignette represents a man before a furnace, presumably assaying; in his right hand a pair of tongs, in his left a pair of bellows; on the ground, pieces of apparatus: a mould, crucibles, a distilling apparatus, &c. Through what seems to be the door, is a view of a mine, with miners at work. This woodcut is contained also in Cammerlander's edition of the "Alchimia." At the end of the tract there is a scroll ornament. As has just been said the work is not dated, but the theme of it, the publication by Cammerlander and the vignette, bring it into immediate connection with the same publisher's edition of Kertzenmacher's "Alchimia," which was described to the Society on 15th December, 1909.¹ That book was published in 1539, and it is likely that this one appeared about the same time, say in 1540. It may be observed, as showing the casual methods of the old printers, that the vignette, which was appropriate enough for Kertzenmacher's work, does not apply to the present one, which has no reference either to assaying or mining; but as the cut was in his hands at anyrate, Cammerlander apparently thought that it could be used decoratively for filling a blank space.

27. As far as the book itself is concerned, it also is a novelty. There is no copy in the British Museum, or if there be, it does not appear under its own title, but it is included by Graesse² in his catalogue of rare books, which is the only reference to it I have

¹ *Proceedings of the Royal Philosophical Society*, Glasgow, 1910, xli., p. 113.

² Graesse, *Trésor de Livres rares et précieux*, Dresde, 1863, iv. p. 363.

observed. Anyhow it is a rarity, which may be due to its small size, and to its having been used up during the last three hundred and seventy years. The wonder is that a copy should have come down to the present time at all. Perhaps even a greater wonder is that it should turn up just in time to take its place along with the family of treatises to which it belongs. What were the chances that it missed recording altogether and having its connection with the other items of the series exhibited? It is the collocation of these tracts which enhances their value from every point of view.

28. The word *Mangmeistery* in the title, is the first thing that attracts attention, for it has not occurred before in any of these books.

The meaning attached to the word *mange* is threefold.¹ First, it denoted a machine used in war for casting great stones, a sort of ballista, or catapult, or mangonel, which is from the same root. Secondly, perhaps from some real or fancied resemblance, it denoted and still denotes a machine for rolling and smoothing woven goods. It was, therefore, a mangle, which word also is probably of the same origin. Moreover, if one remembers the old box-mangle, one can perhaps trace the connection between it and the war engine. For it consisted of an oblong box filled with big stones, attached by a rope at each end to a central roller turned by a handle, so that as one rope was wound up and pulled the box in one direction, the other unwound and allowed it to travel along.² The articles to be smoothed and pressed were wrapped round hard wood cylinders, carefully turned, which were put between the box and the smooth solid level bed over which the box passed to and fro. The place where this rolling operation was carried on was

¹ Matthias Lexer, *Mittelhochdeutsches Handwörterbuch*, Leipzig, 1872, I. cols., 2029, 2030, 2031.

² Readers of "Nicholas Nickleby" may remember the picture of the box-mangle, at which inexorable fate brought Mr Mantalini to grind.

There is a curious, because, on the part of the author, probably unwitting, collocation of the two ideas in the following passage, which by the ordinary reader might be skimmed over as fanciful (as possibly the author meant it) instead of its actually expressing identity of origin:

"In a corner below the mangle, on a couple of stools, sat two very little children: a boy and a girl; and when the very long boy, in an interval of staring, took a turn at the mangle, it was alarming to see how it lunged itself at these two innocents, like a catapult designed for their destruction, harmlessly retiring when within an inch of their heads." *Our Mutual Friend*, Bk. I., ch. XVI.

called the Manghûs, the manager was the Mangmeister, and his art Mangmeistery.

The word, however, seems to have received a third meaning, namely, a dye or colour, and it is said that in Nürnberg *Mangmeister* meant a dyer.¹

It is only in this last sense that the title of the present book has any significance, for there is nothing in it relative to rolling or mangling, and still less to stone-casting in war, whereas the tract is chiefly devoted to dyeing and to the making and use of colours.

29. Its contents are arranged in five chapters, not very well defined typographically, but clearly enough by subject.

Chapter 1, treats of the dyeing of yarn and linen, parchment, horn and feathers.

Chapter 2, deals with the removal of spots and stains from velvet, silk and other fabrics, and how to restore the colour to linen, &c.

Chapter 3, describes the dyeing of leather.

Chapter 4, shows how to impart a gold or silver colour to metals.

Chapter 5, relates to iron and steel and how to harden and soften them, and to etch on them.

30. As the list is a short one and the little volume has neither a table of contents nor an index, it may be useful to enumerate the receipts.

Cap. i. Wie mann leinwat soll ferben.	Aij r
Garn vnd Leinwat Braun zuferben.	
Garn vnd Leinwat Blaw zuferben.	
Eyn Blawe farb allerley blaw mit zuferben.	Aij r
Rot zuferben.	
Eyn ander rote farb.	
Wie mann Holtz, Beyn, vnd Horn ferben soll.	Aij r
Grün zuferben.	
Eyn ander grün.	
Eyn anders.	
Rot zuferben.	
Gelb zuferben.	Aij r
Schwartz zuferben.	

¹ Grimm, *Deutsches Wörterbuch*, ed. Moriz Heyne, Leipzig, 1885, VI. col 1550.

- Cap. ij. von allerley Mackel vnd flecken aus Gewandt Sammat seiden, Gülden stücken vnd Kleidern zu bringen, Es seien schmaltzflecken, öl oder weinflecken, oder wie die mögen genennt werden, vnd das alles leichtlich on schaden mitt wassern odder laugen, wie es dann inn disem Büchlin gelert wirt, zu volbringen.
 Eynem jeglichen Gewandt sein verlorne farb wider zu bringen.
- Flecken ausz dem wülen thuch zubringen. Aiiij r
 Eyn anders.
 Eyn anders.
 Eyn wasser zumachen damit mann flecken ausz weissem gewand mag bringen. Aiiij v
 Wie mann schmaltz oder öl flecken ausz weissem thuch bringen soll.
 Wie mann schmaltz oder ölflecken ausz allerley gewant, on ausz weissem vertreiben soll.
 Eyn anders schmaltz flecken zuvertreiben.
 Weinflecken ausz allerley thuch zubringen. Bj r
 Allerley flecken ausz seiden schleieren zuvertreiben.
 Allerley mackel vnd flecken ausz dem Carmesien Sammat zubringen.
 Eyn Sammat der do weich ist, steiff vnd starck zumachen.
 Eyn wasser das alle mackel vnd flecken ausz Güldenstücken vnd Sammat hinweg nimbt. Bj v
- Cap. iij. Von Lederferben. Bj v
- Cap. iiij. Von silber vnd goldtfarben, auff allerley Metal zumachen vnd erstlich ein Gold vnd silber grund auff eisen, glocken, gestein &c., das nit vom wasser abghet. Biiij v
- Eyn goldtfarb auff Silber, Zyhn, kupffer &c.
 Eyn anders. Biiij r
 Eyn anders.
 Eyn anders.
 Eyn goldtfarb auff Zihn kupffer vber silbern. Biiij v
 Stahel oder eisen zuvergülden.
 Cap. v. Vom stahel vnd eisen. Biiij v

Eysen Härte zu entlassen.	Cj r
Eyn ander entlassen.	
Ein anders, so dir etwas zu hart ist, vnd wilt jn die härte eins theyls entlassen.	
Eyn anders eisen zuweichen.	
Eyn anders weich vnd zähe zumachen.	
Volgen nun die stück, wie mann den Stahel herten soll.	
Stahel hart vnd gute schneid zumachen.	Cj r
Eyn ander gute härt.	
Auff das dir das waffen, oder was du herten wilt nit zerspalt, oder reisse vom herten.	
Eyn herte zu waffen.	Cij r
Feyhel herte.	
Eyn herte zu den hawhemmern der feyeln, vnd anderer schrotwaffen.	
Eyn Herte die alles durch hawet.	
Eyn härte zu Nebgeren, Börern vnd anderen Waffen.	
Volget nun wie mann stahel weich sol machen das mann jn schneiden mag.	
Eyn anders.	Cij r
Eyn anders.	
Eyn anders.	
Volget wie mann löten soll, Vnd erstlich wie mann Eysen kalt soll löten.	
Warm zulöten.	Cijj r
Eyn lötung auff kupffer.	
Messing zu Löten.	
Eysen Löten.	
Eyn Puluer zumachen das alle Metal flüssig vnd schmidig macht.	Cijj r
Item Eyn anders auff Ertz.	
Item ein anders.	
Item ein anders.	
Wie mann in Stahel vnd eisen oder auff waffen etzen sol.	
Eyn andere art, mit wasser zu ätzen.	Ciiij r
Ein anders vnd scherffer.	

Comparison of this table with those already given will make plain the connection of these tracts with each other.

31. Under the *Künstbüchlin* of 1537 (1886, No. 3), I gave a

short abstract of the substances and methods employed in working out the receipts practically, and this abstract may suffice for the present. The account could be easily extended so as to exhibit a fuller view of the chemical arts in the middle of the sixteenth century, and I may reconsider this topic also on some other occasion. Meantime my purpose is to trace the relationship of the published documents to one another.

32. The tract called *Rechter Gebrauch d'Alchimei* (1886, No. 1) and the others just described, make up the conjoined edition of 1537, as I have tried to exhibit in the accompanying parallel table of contents (§ 41). It will be observed, however, that there are differences which might make it more correct to say that the tract *Mangmeistery* is itself a conjoined edition of that of 1532 with possibly one on iron and steel, which, however, I have not seen mentioned anywhere, and the existence of which I infer only from its presence in the *Mangmeistery* itself and the *Künstbüchlin*. On the other hand that section may have been printed in one of these for the first time. It seems also open to question whether the *Mangmeistery* tract was prior or subsequent to the *Künstbüchlin*, because it includes the section on the dyeing of leather, which so far as one can judge from the title is not contained in the 1532 Nürnberg tract on taking out spots and stains, is certainly not in the 1532 Zwickau edition, and as certainly is not in the 1537 *Künstbüchlin*. From this I think it can be inferred that the compiler of the 1537 *Künstbüchlin* reprinted the 1532 tract, and not the *Mangmeistery*. It does not follow from that that the *Mangmeistery* is later than 1537, but probably it is, for otherwise the receipts about leather would hardly have been omitted.

33. There remains still the question whether the *Mangmeistery* is an original work or a translation from the Dutch, in whole or in part. This is difficult to settle, for I have not seen an earlier Dutch version of any part of the collection than of 1549. On the other hand, in Mascall's translation, there is a number of the receipts about colours and leather, in the same order too, which appear to have been made from a Dutch and not from a German original. The earliest Dutch version I have seen, that of 1549, contains the sections on dyeing linen, removing stains, and on iron and steel, which appear in the *Mangmeistery*, and the author, Andree or Andriessen, speaks of his work as a translation and compilation, which gives us no help out of the difficulty. The

existence, therefore, of an early Dutch version, which may have been used by Mascall, must remain, in the meantime, an unconfirmed possibility. The detailed evidence on this topic will be given afterwards, but the chief reason may be stated briefly.

In the course of his translation Mascall seems sometimes to have hesitated about the exact meaning of a word and correct rendering of a phrase, and then he added the doubtful word or phrase to avoid error, or misconception. This has happened about twenty times, and it is observable that the equivalent words quoted are never in German, but always in Dutch. Now if he had been translating from a German, and not dealing with a Dutch original, it is not easy to see what inducement he had to introduce Dutch words as he has done, besides stating categorically that they were Dutch. The natural thing would have been to insert the doubtful German word, and not go out of his way for a Dutch one. Presumably, therefore, in these cases, the original was Dutch.

I am not now sure, however, that these intrusive words, curious and numerous though they be, are of themselves sufficient to prove the existence of an entire Dutch edition, but they cause a difficulty and require further examination.

34. The theme has developed by the acquisition of this material, and it has thereby received fresh interest. The subject is turning out rather more involved than one would have anticipated, when the attempt is made to "redd marches" betwixt these dated and undated tracts. The later reprints present less difficulty, but the early editions are not so easily put in their places on account of apparent gaps, which leave the sequence or arrangement doubtful.

35. This is illustrated by the contents of the tracts respectively, comparison of which at least suggests, if it do not justify, certain deductions :—

1°. The *Rechter Gebrauch d'Alchimei* and the *Artliche Kunste*, both printed in 1531, are the first editions of these books and the first books of the series.

2°. In 1532 appeared the first edition of the receipts for taking out spots and stains, and restoring faded colours, but whether at Nürnberg or Zwickau first, or simultaneously, is not yet determined.

3°. There may have been, besides, a contemporary tract on the

hardening and softening of iron and steel. If there be such a thing, I have not seen it or any mention of it, but the receipts appeared in *Mangmeistery*.

4°. All these, as I have already said, were reprinted in 1537, under the title "Künstbüchlin"; unless the last mentioned section upon iron and steel appeared in it for the first time.

It is difficult to say which of these alternatives is the more probable.

5°. With regard to the receipts for the dyeing of leather they too may have appeared in a separate pamphlet, afterwards included in *Mangmeistery*—but it is also possible that they were printed for the first time in that collection.

36. This research is not yet complete, for as long as there are editions mentioned which I have not seen, and others which, as I have been showing, may be deduced from incidental remarks, it is not possible to stop.

37. The Nürnberg edition of 1532 is still to examine: I have now little doubt that it was incorporated in that of 1537, but apparently it did not contain the sections on leather dyeing, or if it did they were omitted in the reprint. As has been already said these sections, as far as I know at present, appeared for the first time in the *Mangmeistery*, which unfortunately has no date.

38. The 1538 reprint or reissue of the 1537 edition has also escaped me.

39. I have already pointed out in connection with Mascall's translation the possible existence of an edition or editions in Dutch, as yet unmentioned by the bibliographers, not to speak of the sources from which he got the receipts not extant in the other collections. There may be others.

40. For, if after collecting these books for four and thirty years,¹ examining others elsewhere and hunting in every available list, the tracts now described appeared all at once without any warning of their existence, what guarantee is there that others, also quite unknown, may not start up as suddenly as these have done and involve some new consideration? I do not think that any material modification of view is likely, but one can never be sure. I have had sufficient experience of the unexpected in book col-

¹ I got Andree's *Kunstboek*, 1549, in February, 1877. I have never seen or heard of another copy since.

lecting to refrain from shutting the door and affirming that none of these wanted will ever appear. They may one or all do so at any moment, and in the most unexpected locality. I suppose I had better wait and see.

But I wish that the unknown numbers would make haste to present themselves and enable one to substitute certainty for speculation.

41. The following table exhibits in a form convenient for comparison the contents of the earliest editions of these collections which I have seen in German, Dutch and English. They are arranged chronologically, the only doubtful point in the table, as has been noted above, being whether the *Künstbüchlin* of 1537 should come before or after the *Mangmeistery*. From the fact that it is a reprint of the others and includes what appears only in the *Mangmeistery*, one would suppose that it must be subsequent to it. On the other hand the *Mangmeistery* contains some sections which the 1537 book does not contain, and one might therefore infer that it came later and had taken in those parts.

But again both omit the receipts about dyeing wood and softening horn contained in the 1532 collection, so that these sections require further elucidation, but for that purpose the material is not forthcoming at the present moment. As far as the table is concerned it makes no difference, though it gives a better view of the contents of the 1537 edition, to put it after the others.

ERRATUM.

Supplement II. § 1, line 5, *delete* "Italian." So far as I know there was no edition in Italian of any of these books.

	Rechter Ge- brauch d' Alchimei 1531	Artliche Kunste 1531	Allerley Mackel . . . aus gewand . . . zu bringen 1532	Mang- meistery n. d.
To make amber, &c.	ff. III. r			
on to	to			
To exalt gold	XXVII. v ⁽¹⁾			
Inks		pp. ii-j-ix		
Colours		pp. ix-xvij		
To write with gold		pp. xvij-xviii		
To etch		pp. xix-xx		
To colour quills, &c.		pp. xx-xxij		
To dye linen			Avij-Aviii	I. Aij-Aiiij
To dye wood, bone, horn			Avij-Bij	Aiiij
To soften horn			Bij-Biiij	
To take out spots and stains			Aij-Av	II. Aiiij Bj
To make pearls			Avj	
To dye leather				III. Bj-Biiij
To put silver and gold colours on metals				III. Biiij-Biiiiij
To harden and soften iron				V. Biiiiij-Cj
To harden and soften steel				Cj-Cij
To solder iron, &c.				Cij-Ciiij
To etch on iron and steel				Ciiij-Ciiiiij

(¹) This is the whole book.

(²) This is contained in Parts IV., V. and VI. with a portion of Part III. Most of the receipts in the 1531 *Gebrauch* are included. Some however are omitted, there is occasional alteration of the order, and receipts have been added from other sources.

Künst- büchlin 1537	Kunst- boeck 1549	Ettliche Künste 1563	A profitable Book 1583	A Booke of Secrets 1596
ff. XVI. to XXXVII.	Tract. III. ff. xvij to VI. liij ⁽²⁾			
VIII.-X.		Aij-Avij		A3-B2
X.-XIII.		Avij-Bvij		B2-C2
XIII.-XIII.		Bvij-Bvij		C2-C3
		Bvij-Cij		C3-C4
XIII.-XV.		Cij-Cij		C4
XV.	III. xij-xv.			
XV.-XVI.	xv-xvj	Cij-Cij		
XVI.	xvj-xvij			
VI.-VII.	II. ix-xij	Cvij-Cvij ⁽⁴⁾		
		Cij-Cvij	pp. 44-49	
V.-VI.	I. vij-ix		pp. 71-72	
II.	i-iiij ⁽³⁾		pp. 59-70 ⁽⁵⁾	
II.-III.				
III.-III.	v-vj		pp. 73-75	
III.-V.	vj-vij	Bvij-Cij	pp. 76-78	

⁽²⁾ The receipts for hardening iron and steel come first and those for softening them next.

⁽⁴⁾ Only four of the receipts in *Mangmeistery* are reprinted.

⁽⁵⁾ Here again are several receipts not contained in the others. The receipts for softening iron and steel and those for hardening them are kept apart.





SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

SUPPLEMENT IV.

BY
JOHN FERGUSON, LL.D.,

REGIUS PROFESSOR OF CHEMISTRY IN
THE UNIVERSITY OF GLASGOW.

GLASGOW:

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW,

BY CARTER & PRATT, LTD., 51-53 CANAL STREET, S.S.

1913.

SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

SUPPLEMENT IV.

BY
JOHN FERGUSON, LL.D.,

REGIUS PROFESSOR OF CHEMISTRY IN
THE UNIVERSITY OF GLASGOW.

GLASGOW:
PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW,

BY CARTER & PRATT, LTD., 51-65 CANAL STREET, S.S.

1913.



Artliche kunste
mancherley weisse Din
 ten vnd aller hand farben zubereiten.
 Auch Golt vnd Silber sampt allen Metallen/
 aus der Seddern zu schreyben. Mit viel andern
 nützlichen Künstlin / Schreybseddern vnd per-
 gamenen allerley farben / zu farben. Auch wie
 man schrifft vñ gemelde auff Streheline / Eysen-
 ne waffen / vnd des gleychen / Kien sol
 Allen Schreybern / Brieff malern / sampt an-
 dern solcher Künsten liebhabern / ganz los-
 stig vnd fruchbarlich zu wissen.

Den ynhalt aller Kun-
 ste dieses Büchlin / findet man an der er-
 sten seiten des nachfolgenden blats /
 nach ordnüg eins Registers/
 verzeychnet.

Ms. D. XXXII.

Some Early Treatises on Technological Chemistry. Supplement IV. By JOHN FERGUSON, LL.D., Regius Professor of Chemistry in the University of Glasgow.

[Read before the Society, Wednesday, 4th December, 1912.]

1. At the close of my last paper (Supplement III.)¹ I suggested that there might be editions of these books not yet discovered, and that it might be well to see what fortune would bring. I had not long to wait, for though none of the editions suggested as possible and desirable have presented themselves as realities, yet in confirmation of my forecast (§§ 39, 40) that examples of unknown editions might turn up without warning at any time, two such came to my knowledge in July last, as unexpectedly as the copies had shortly before arrived at the Library of the Patent Office in London, where they now are. By the kindness of the librarian, Mr Hulme, I have had access to these books, so that I can furnish not only a description of them, but facsimiles of their title-pages as well. They contain nothing new, but the date of one of them involves the reconsideration of a problem already stated, while it makes the solution of it rather harder than it seemed before. An account of these books may now be given and their relationship to the other editions examined.

FIRST TRACT.

2. The earlier of the two books by date, 1532, has the following title-page:—

[Artliche kunste]
mancherley weise Din
[ten vnd aller hand Farben zubereiten.
Auch Golt vnd Silber sampt allen Metallen,]
aus der Feddern zu schreyben. Mit viel andern
nutzlichen Kunstlin, Schreybfeddern vnd Per-

¹ *Proceedings of the Royal Philosophical Society*, Glasgow, 1911-12, vol. xliii., p. 232.

gamenen allerley farben, zu ferben. Auch wie
man schrifft vñ gemelde auff Steheline, Eysen-
ne waffen, vnd des gleychen, Etzen sol
Allen Schreybern, Brieff malern, sampt an-
dern solcher K^ensten liebhabern, gantz lu-
stig vnd fruchbarlich zu wissen.

[Den ynhalt aller Kun-]

ste deses Buchlins, findet man an der er-
sten seiten des nachfolgenden blats,
nach ordnūg eins Registers,
verzeychnet.

[M. D. XXXII.]

Small 8vo. A, B in eights; or pp. xxxi., and the last blank. Black letter of several sizes. Ornamental capitals. Title red and black. The red is within heavy brackets.

- p. i. The Title; p. ij. blank.
p. iij. Inhalt dises buchleins.
p. iiij. The text begins, and ends p. xxxi., followed by the colophon:—

Gedruckt ynn
der Churfürstlichen
Stadt Zwickaw
durch Wolff
Meyerpeck
M. D. XXXII

3. This book is a reprint in small octavo form of the quarto of 1531, described in Supplement III., § 2. The special interest, however, lies in its being printed by Meierpeck, whose edition of the receipt book for taking out spots and stains, &c., was likewise described in Supplement III., § 19. That book also was printed in 1532, in the same style and size as the present one, so that it may be inferred that Meierpeck had an eye for uniformity, as well as a desire to publish books of practical utility.

4. This edition calls for no special remark. It is simply a reprint with the change of a word here and there, but the receipts are identical, and even the construction of the table of contents is

Rünstbüchlin-gerech- ten gründtlichen gebrauchs aller kunstbaren Werckleüt.

Von { Erzarbeit/ in vn̄ außserhalb feürs/ auß Alchimistischem
vnd natürlichen grund/nemlich/
Härten/Weychen.
Schmelzen/Schaiden.
Abtreiben/Probiern.
Löten/Egen.
Abformen/Abgießen ic.
Jede farben zübereiten/erhalten/
bessern vnd widerbüngen/als zum
Malen/Schreyben.
Illuminieren/Vergulden.
Sticken/Edelgestain ic.

Alles Inhalt zü end beygelegten Registerlins.



M. D. XXXV.

the same, only with the pagination necessarily altered to suit the different size of the volume.

5. One point, however, may be noticed. In Supplement III., §§ 12-17, attention was directed to the receipt for making a fine green colour, which in succeeding editions underwent various alterations from the original as published in 1531. In this edition of 1532, however, the receipt (p. xvij.) "Hübsch Grün," is reprinted exactly as it stands in the edition of 1531.

6. In Supplement III., § 23, the question was discussed whether the Nürnberg and Zwickau editions of the receipts for taking out spots and stains, both dated 1532, were published simultaneously, or, if not, which came first. In the absence of a copy of the Nürnberg edition it is impossible to decide. Considering, however, that the present edition of the *Artliche Kunste* is unquestionably a reprint, the inference is plausible at least that the other, uniform with it in every respect, and similar to it in subject, is also a reprint. Comparison of the facsimiles of the title-pages demonstrates that they are companion volumes and may have been brought out together by Meierpeck intentionally. The publication by Meierpeck of these two books in uniform style may have suggested to some one, perhaps to Steyner, the printer, himself, the plan of gathering the separate tracts into one volume, the *Künstbüchlin*, so often referred to, being the result.

SECOND TRACT.

7. The other tract is an edition of the said *Künstbüchlin*, dated 1535. Both it and the edition of 1537 were printed by Steyner at Augsburg in the same form; in fact they are practically identical. I give a facsimile of the title-page of each, that of 1535 from the copy in the Library of the Patent Office, and that of 1537 from the copy which has been in my possession since December, 1879, and was described by me in 1886.¹

8. The following is an account of the book :—

Künstbüchlin, gerecht-
ten gründtlichen gebrauchs
aller kunstbaren Werckleüt.

¹ *Proceedings of the [Royal] Philosophical Society*, Glasgow, 1888, vol. xix., p. 134.

Von	{	Ertzarbeit, in vñ ausserhalb feürs, auss Alchimistischem
		vnd natürlichen grund, nemlich,
		Harten, Weychen.
		Schmeltzen, Schaiden.
		Abtreyben, Probiern.
		Loten, Etzen.
		Abformen, Abgiessen &c.
		Jede farben zubereiten, erhalten,
		bessern vnd widerbringen, als zum
		Malen, Schreyben.
		Illuminiern, Vergulden.
		Stricken, Edelgestain &c.

Alles Inhalt zu end beygelegten Registerlins.

[Vignette]

M. D. XXXV.

Small 4°. A to H in fours, J six, or ff. xxxvii. [I].

Jvi. *recto*, the colophon, after the table of contents: Getruckt zu Augspurg, durch Heinrich Steyner, | am XVI. tag Junij, im M. D. XXXV. Jare. |

The *verso* is blank.

9. This edition of 1535 supersedes, of course, that of 1537, in all that has been said throughout this research in connection therewith. Hitherto the *Künstbüchlin* of 1537 has been assumed by me as the first collected edition, so to speak, but it proves now to be not the first, but merely a reprint. There is, therefore, but little to add about the 1535 edition except to indicate in what respect that of 1537 differs from it.

10. The 1537 edition is a page for page and, with only a few exceptions, a line for line reprint of that of 1535, and the contents are identical. But there are more misspellings, and the impression is not quite so clear and carefully done. Such falling off is a common feature of successive editions, and in this case the printer may have hurried out the new edition to supply the demand.

11. Some other differences which distinguish the two editions from each other may be referred to.

The signatures occupy different positions at the foot of the page, relatively to the line of text above.

Rünstbüchlin - gerecht- ten gründtlichen gebrauchs aller kunstbaren Werckleut.

{ Ergarbeit/inn vnd aussserhalb fehrs/auß Wdhinstischen
vnd natürllichem grund/nemlich/

Härten/Weychen.

Schmelzen/Schaiden.

Abtreiben/Probiern.

Löten/Egen.

Von } Abformen/Abgießen ic.

Jedefarben züberaiten/erhalten/
bessern vnd widerbringen/als zum

Malen/Schreyben.

Illuminieren/Vergulden.

Stricken/Edelgestein ic.

Alles Inhalt zu end beygelegten Registerlins.



M. D. XXXVII.



The initial, or ornamental, capitals are different in various places.

Different words are contracted in the two editions.

Here and there lines are different in length to the extent of a word or portion of a word.

In the two editions capitals are used differently. There seems to have been no rule to follow, not even in the same house.

12. The following examples of variations in the text, taken at random, will illustrate the kind of differences between the two editions.

	1535	1537
fol. III. v. l.	4 from the bottom : all	alls
IIII. r. l.	1 werden	werdenn
l.	9 Borres	Borras
l.	5 from the bottom : fügen	fü ^o genn
v. l.	16 vñ	vnd
l.	21 teyl	theyl
l.	6 from the bottom :	
	vñ verwüsch dz gemâld	vñ vermijsch das gemâld
V. r. l.	2 das du es kalt auflegest	das du es auflegest
l.	2 iñ	inn
v.	The first receipt by closer printing and con- tractions occupies 8 lines	The first receipt occu- pies 9 lines
l.	22 Nym̄ dañ darzu virniss vnd leynol	Nim̄ dañ darzu firniss vnd leinol
l.	23 verglasurten	verglasaurten
VI. r. l.	11 nīm	uīm
l.	20 Allerlai Mackel vñ fleckē auss gwād	Allerlay mackel vñ fleckē auss gwand
VII. v. l.	19 Nīm vier teyl Dragant	Nīm vier tail Dragant
VIII. v. l.	3 from the bottom : alle	alle
XIII. r. l.	7 Ein gutte weysse Farb	Ein gute weyse farb zumachen
XVI. r. l.	6 from the bottom :	
	Horn waychen	Horn zuwaychen

	1535	1537
XVII. r. l.	2 from the bottom: Perlin	Berlin
XVIII. r.	at the top VXIII.	XVIII.
v.	Kupffer vnd Messing vergülden Vergüld silber schneidē	Kupffer vnd Messig zuvergulden Vergild silber schney- den
XX. r. l.	24 zwei wochen	zwü wochen
	Sig. F is mis-numbered XX., XXI., XXII., XXIII. in both editions.	
XXX. r. l.	9 feijl	feijls
XXXVII. r. l.	9 vitriol	victriol
v. l.	24 Stein der sich von nasse anzünt	Stein sich von nasse ^e anzünt
J. 6 r. l.	21 Alann calcioniern	Claun calcioniern, which is a misprint.

13. There is, however, a more important consideration than that of typographical variations. The throwing back of the publication of the *Kunstbüchlin* by a couple of years alters its relationship to the *Mangmeister*, about which, as I have already shown, most of the trouble gathers. Much more is that now intensified by the earlier 1535 edition, as the following examination will demonstrate.

14. The question that arises is this: was the collected edition of 1535 actually the first, or was there one before it? If there was, it could not be earlier than 1533, consistently with the dates of the incorporated tracts. If there was one before them, that is, before 1531, then the attempt I have been making for a long time to arrange the editions is futile, and nothing more can be done till editions prior to 1531 are forthcoming. It does not seem likely that such editions exist, for every one that has appeared hitherto is either of 1531 or after it. Anyhow, it will be time enough to discuss details or to reconsider the whole question when some of these earlier editions appear, and, until then, I shall continue the original assumption that 1531 is the first date with which we are concerned (Supplement III., § 35).

15. The *Kunstbüchlin* of 1535, or 1537, is composed of four tracts, the first three of which are extant in separate form, dated

1531, 1531, 1532, respectively. The inference is obvious that the fourth tract, in order to be conjoined with the others, must also have existed separately prior to 1535. The only edition, however, of the fourth tract at present known to me was printed by Cammerlander under the name *Mangmeistery*. This book is not dated, though, if it could be shown, that it was published before 1535, or, in general, before any edition of the *Künstbüchlin*, there would be no further difficulty, as all four tracts would be accounted for. But Cammerlander's book on account of its size, printing, illustration, &c., is probably later than 1537, and it so closely resembles the book published by him in 1539, described in Supplement II.,¹ that it may have the same date, or, say 1540, assigned to it. Assuming that date to be correct, there are two ways of accounting for the presence of the fourth tract.

16. Since it forms an integral part of the collection the inference as I have just said is unavoidable that like the other three parts it existed separately in an edition before 1535. If that be so Cammerlander's undated edition is merely a reprint or new edition of this one. I have not seen or heard of such an edition, but that has no significance.

The other explanation of the fourth tract is that the receipts composing it were collected by the editor, or by some one for him, and published for the first time in the *Künstbüchlin* in 1535, or in an earlier edition of it, if such there were. Afterwards these receipts, thus constituting the fourth tract, were published separately by Cammerlander under the title *Mangmeistery* in, say, 1540.

17. It must be observed, however, that the undated *Mangmeistery* contains receipts on dyeing leather and making pearls which are not in the *Künstbüchlin*. Now, if there was an earlier separate edition of the fourth tract, whether it went by the name *Mangmeistery*, or any other, makes no difference, did it, or did it not, contain these extra receipts? If it did, why were they omitted when the tract was included in the *Künstbüchlin*? If it did contain them, naturally when Cammerlander reprinted the book, those receipts were reproduced also. But if it did not contain them, that explains why they do not appear in the *Künstbüchlin*, but in that case Cammerlander must have obtained them from some other source and added them on to his reprint. Can there have

¹ *Proceedings of the Royal Philosophical Society of Glasgow*, 1910, vol. xli., p. 113.

been a separate tract containing those receipts, and, if so, is there a copy of it anywhere in existence? If there be no such tract, where did they come from?

18. Which alternative then is the more probable: that the tract we know as *Mangmeistery*—with certain omissions—went along with three other tracts to the making of the 1535, or earlier, *Künstbüchlin*, or that the fourth section of the *Künstbüchlin* first collected and published in it, was printed separately with certain additions under the title *Mangmeistery*?

If the latter, did the editor of the *Künstbüchlin* himself compile the *Mangmeistery* and add the extra receipts?

When one considers that the first three tracts in the *Künstbüchlin* are reprints of extant editions, one would like to know definitely in what position the fourth tract, corresponding to the *Mangmeistery*, in the 1535 collection, stands to Cammerlander's edition which was almost certainly later than 1535. It seems to me much simpler to assume that there was an early edition of the *Mangmeistery* which was reprinted in the *Kunstbuchlin*. But if on the other hand it is the *Mangmeistery* which is the reprint from the *Kunstbuchlin*, from what source were the receipts which it contains originally derived? The problem of origin is thus removed only another stage backward. If the *Mangmeistery* is not the original collection, where is it, and what is its name? If it be the original, why were receipts it contains omitted when it was transferred to the *Kunstbuchlin*. If it be not the original but a reprint from the *Kunstbuchlin* collection, where did the additional receipts come from that differentiate Cammerlander's edition from the *Kunstbuchlin* version?

The answer is probably quite easy, but no data are forthcoming for it. A copy of a pre-1535 *Mangmeistery* might dispel the whole difficulty.

19. It would appear as if copies of these books had been at one time in existence or may be so now, but until they are available for comparison, there will remain unsolved these doubts and difficulties relative to their sources, their connections, their succession, their entire history.

THE ENGLISH TRANSLATION.

20. I pass next to a fuller examination of the English translation of the tract *Artliche Kunste*, 1531, than I was able to afford it in

Supplement III, § 7-17. As the tract is a short one I have transcribed it bodily, for there are advantages in so doing:—

The contents as they stand are more concise and correct than any abstract or descriptions of them or quotations from them can be;

The actual expressions and form will give the best notion of what practical receipts were like in Queen Elizabeth's time, over three hundred years ago, even though the original was sixty years earlier;

It is easier to compare the actual translation with the original, and to indicate what appear to be misunderstandings and to catalogue omissions. Any notes also that may be necessary will be more intelligible;

As the book is a rare one the transcription will at all events preserve the contents should the original ever go astray and it will also make them more readily accessible to those who may feel some curiosity about the subject.

Reference may be made to Supplement III. § 3, for the contents of the original German of 1531, and to § 8 for the contents of the present English translation. Comparison of the two will show what receipts have been omitted. In § 9 are some notes on the differences between them, and these in a more extended form are given in the present paper at the end of the reprint of the text.

A

BOOKE OF SECRETS:

Shewing diuers waies to make and prepare all
sorts of Inke, and Colours: as Blacke, White,
Blew, Greene, Red, Yellow, and other Colours.

Also to write with Gold and Silver, or any kind of Mettall
out of the Pen: with many other profitable secrets,
as to colour Tails and Parchment of
any colour: and to graue with
strong Water in Steele
and Iron.

Necessarie to be knowne of all Scriueners, Painters,
and others that delight in such Arts. Translated out of
Dutch into English, by W. P.

Hereunto is annexed a little Treatise,
intituled, *Instructions for ordering of Wines:*
Shewing how to make Wine, That it may continue

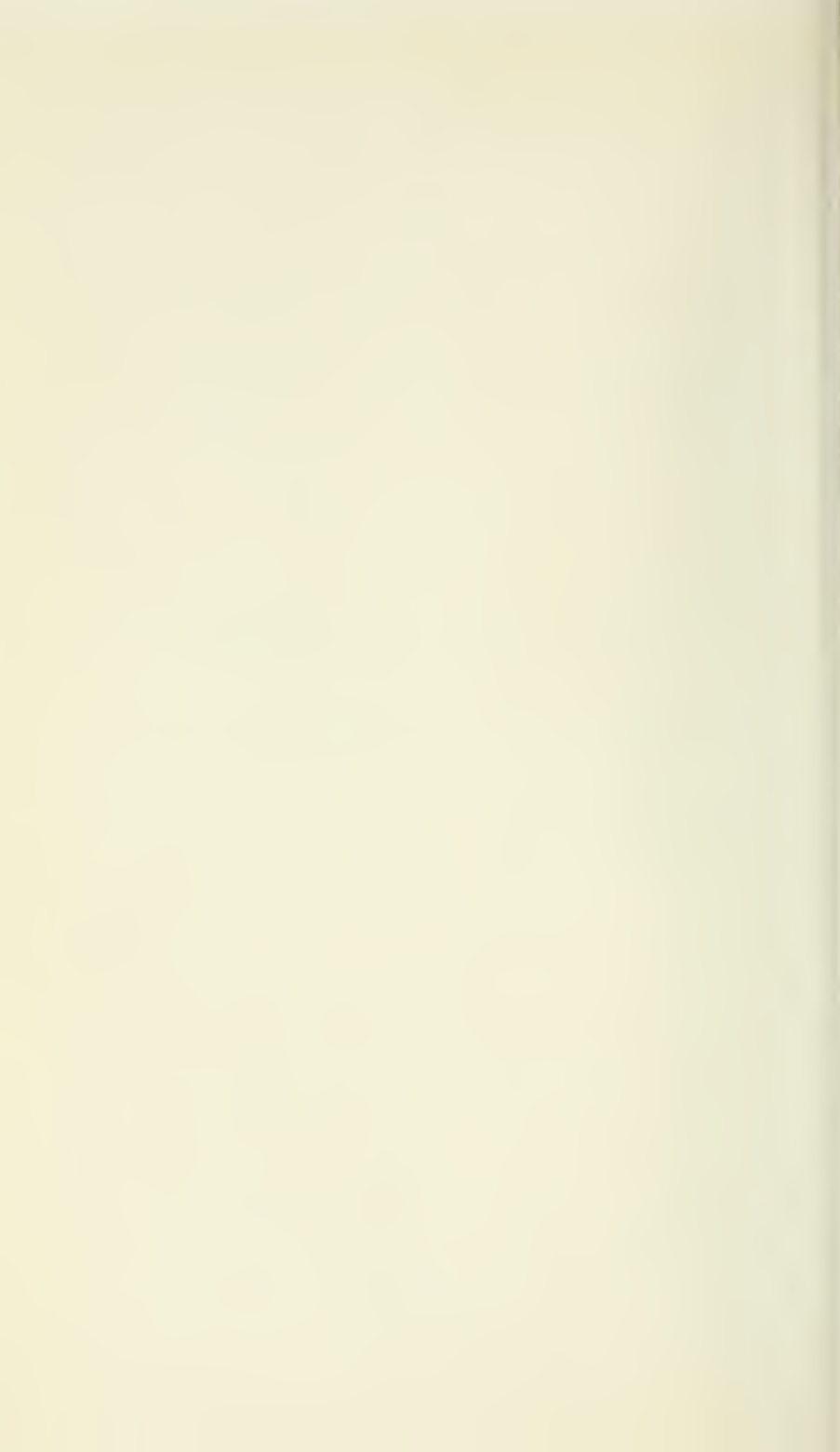
good and faint nor, Neither become fower, nor loose colour. And
how you may remedie faint Wine, take away the boati-
nesse, with other instructions for the pre-
seruation of the same.

*Written first in Italian, and now newly translated
into English, by W. P.*



L O N D O N,

Printed by Adam Islip for Edward
White, and are to be sold at his shop
at the little North dore of Pouls,
at the signe of the Gun,



A
B O O K E O F S E C R E T S :

Shewing diuers waies to make and prepare all
sorts of Inke, and Colours: as Blacke, White,
Blew, Greene, Red, Yellow, and other Colours.

Also to write with Gold and Siluer, or any kind of Mettall
out of the Pen: with many other profitable secrets,
as to colour Quils and Parchment of
any colour: and to graue with
strong Water in Steele
and Iron.

Necessarie to be knowne of all Scriueners, Painters,
and others that delight in such Arts. Translated out of
Dutch into English, by *W. P.*

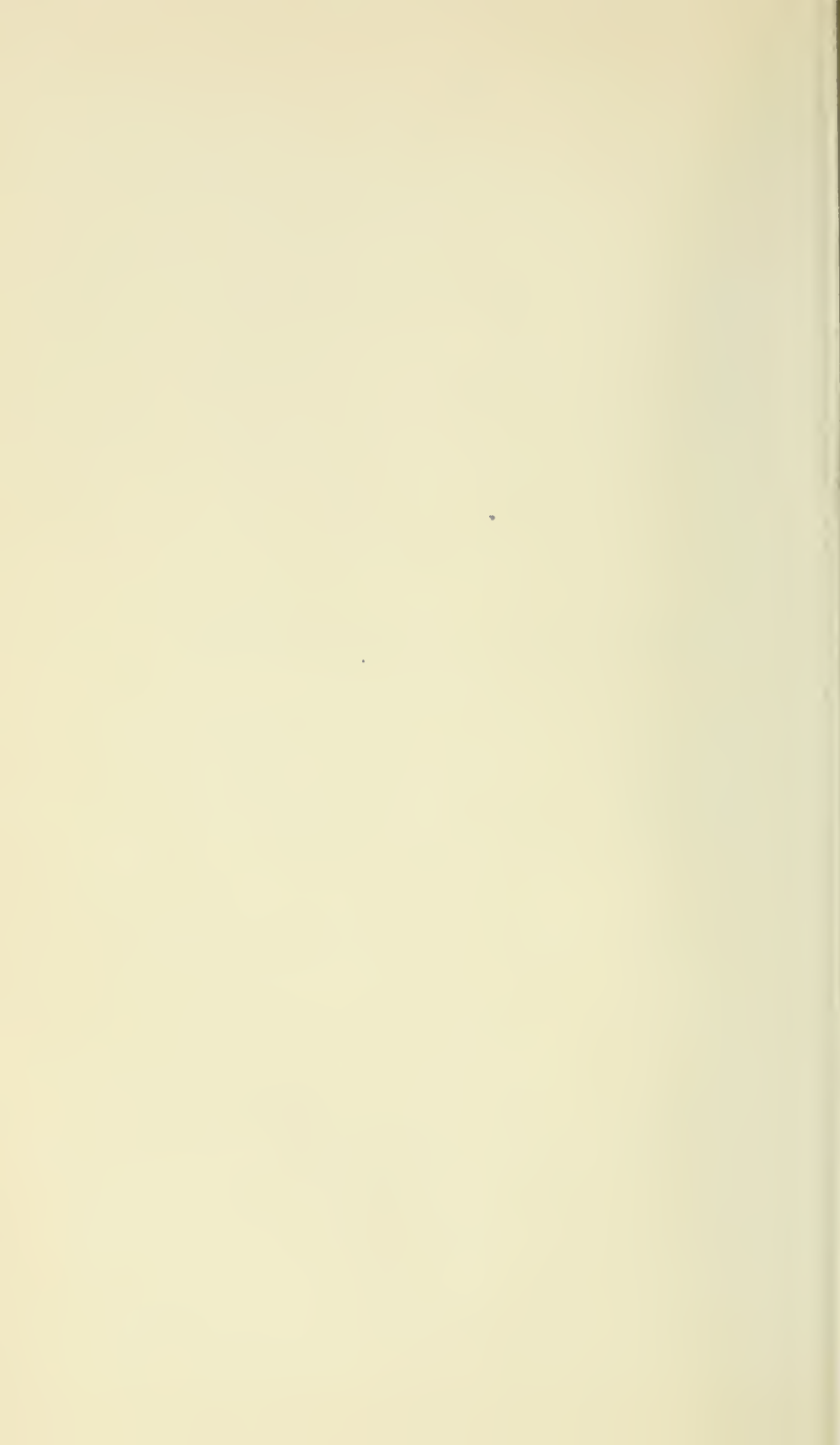
Hereunto is annexed a little Treatise,
intituled, *Instructions for ordering of Wines:*
Shewing how to make Wine, That it may continue
good and faint not, Neither become sower, nor loose colour. And
how you may remedie faint Wine, take away the hoari-
nesse, with other instructions for the pre-
seruation of the same.

*Written first in Italian, and now newly translated
into English, by W. P.*

[Ornament.]

L O N D O N,
Printed by Adam Islip for Edward
White, and are to be sold at his shop
at the little North dore of Pouls,
at the signe of the Gun.

1 5 9 6.



¶ A Booke of Secrets, shewing di-
uers waies to make and prepare all
sorts of Inke and colours.

And first to make Inke in diuers maners.

	T is first to bee vnderstood	5
	that if you wil make a great	
	quantitie of Inke toge-	
I	ther, you must encrease the	
	waight, and measure, accor-	
	ding to the proportion you	10
	meane to make, as for exam-	
	ple, if you will make ten quarts of Inke, then	
	take foure quarts of water, and sixe quarts of	
	vineger and wine, that is, three of each sort,	
	which together with the water make ten	15
	quarts, and so must you doe with other quanti-	
	ties, either more or lesse. The like must you doe	
	in the waight of your other stuffe that belon-	
	geth therevnto, as for a pint of water, sixe oun-	
	ces of gaule, foure ounces of victriall, and foure	20
	ounces of gum, and if you take foure quarts of	
	water (which is eight pints) if you giue to eue-	
	ry pint his proportion, then multiplying eight	
	by sixe they make fortie eight, so many ounces	
	of gaule must you put to ten quarts, mixed as	25
	afore said with wine, vineger, & water, and of	
	victrial and gum, of each xxxii ounces, accor-	
	ding to the first proportion, and so must you ob-	
	serue your quantities, of waight and measure	
	in each proportion, as you are minded to en-	30
	A 3	crease

A Booke of Secrets.

crease the same, as in this treatise you shal read.

To make Inke to write vpon paper.

Take halfe a pint of water, a pint wanting
a quarter of wine, and as much vineger, which
5 being mixed together make a quart & a quarter
of a pint more, then take six ounces of gauls
beaten into small pouder, and sifted through a
siue, put this pouder into a pot by it selfe, and
poure halfe the water, wine, and vineger into
10 it, take likewise foure ounces of victriall, and
beat it into pouder, and put it also in a pot by it
selfe, whereinto put a quarter of the wine, wa-
ter, & vineger that remaineth, and to the other
quarter, put foure ounces of gum Arabike bea-
15 ten to pouder, that done, couer the three pots
close, and let them stand three or foure daies to-
gether, stirring them euery day three or foure
times, on the first day set the pot with gauls
on the fire, and when it begins to seeth, stir it
20 about till it be throughly warme, then straine it
through a cloath into another pot, and mixe it
with the other two pots, stirring them well to-
gether, and being couered, then let it stand three
daies, till thou meanest to vse it, on the fourth
25 day, when it is settled, poure it out, and it wil be
good inke. If there remaine any dregs behind,
poure some raine water (that hath stand long
in a tub or vessell into it, for the older the water
is, the better it is, and keepe that vntill you
30 make more inke, so it is better the clean water.

To

A Booke of Secrets.

To make Inke for parchement.

Make it in all points like to the inke afore-said, only take a pint of water, & of vineger and wine a pint more, that is of each half a pint.

Another sort of Inke.

5

Take a quart of cleare water, and put it in a glasse, put into it thirteene ounces beaten victriall, let it stand three daies, and stir it three or foure times euery day, then take thirteene ounces of beaten gaules, and put them into a new earthen pot that is wel leaded, poure into them a quart of cleane water, that done, set it on the fire, and let it seeth till it consumeth about a finger deepe, but suffer it not to seeth so fast that it seeth ouer the pots brim, then strain it through a wollē cloath, into another pot, that is leaded, poure into the cloath a cup full of good vineger, and strain it through likewise, that done, if there remaineth any thing in the cloath, cast it away, then put into the matter foure or fūe ounces of beaten gum, and stir them well together, then againe straine them through a cleane wollen cloath, and poure into it a cup full of good vineger, and straine it through the cloath, and let it stand till it be coole, then put it into a straight-necked glasse, stop both the glasses well, till you haue occasion to vse them, then take of each water a little quantitie, and mix them together, so haue you good inke.

10

15

20

25

Another of the same sort, but easie to make.

30

Take

A Booke of Secrets

5

Another.

10

15

20

Another.

25

A Booke of Secrets.

cast into it three quarters of an ounce of gum,
and a small peece of alum, both in poulder, and
stir them all together till it be cold.

Another.

Take two handfull of gauls, cut each gaule
either into three or four peeces, poure into them
a pint of beere or wine, (which you wil) then let
it stand eight houres, straine it from the gaules,
and put victriall therein, and to the victriall a
third part of gum, set it on the fire to warm, but
let it not seeth, and it will bee good inke : and of
those gaules you may make inke foure or fve
times more.

To make inke vpon a suddaine, to
serue in an extremitie.

Take a wax candle, and light it, hold it vn-
der a cleane bason or a candlesticke, till the
smoke of the candle hangeth theron, then put a
little warme gum water into it, which tempe-
red together will be good inke.

To keepe Inke that it sinketh not into the
paper neither that it come not off,
and that moths nor mise
hurt not the paper.

Take the shels of hazell nuts, and put them
tino the inke. and it will not sinke through the
paper.

A Booke of Secrets.

And that it may not come off, put a little salt into it.

5 To keepe that neither Mise nor eat or fret the paper, put a little wormewood water into the inke.

To write without inke, that it may not be seen, vnlesse the paper be wet with water.

10 Take pouder of victriall, and put it into a cleane inkehorne, put a little cleane water to it, when the victriall is dissolued, write with it either vpon paper or parchment, and let it drie, and it cannot bee read: when you will read it, take halfe a pint of water, and put thereto an ounce of pouder of gaules, mix them well together, then straine them through a linnen cloath
15 into a cleane pot, then draw the paper through the water, and the writing will be blacke, as if it had been written with inke.

To take Inke out of paper or parchment.

20 Take Colofoniam, which is called pix græcum, beat it small, and cast it on the paper that is written, then wet a cloath, and lay it on the Colofoniam, vpon the cloath lay some fresh horse dung, & vpon that set a smooth tile stone,
25 then if it be in winter let it stand a whole night, but if it bee summer, let it stand but from morning till nine of the clocke.

Otherwise.

Take Salarmoniacke, and alum, still it in a limbeck,

A Booke of Secrets.

limbeck, and with this water wet the writing
and it will goe out.

Of red colour, and first of Brasill.

You must take care when you seeth Brasill,
that you do it when the element is clear, with-
out clouds raine, or wind, otherwise it will not
be good you must make it thus : 5

Take quicklime poure raine water vpon it,
let it stand all night, in the morning poure the
water softly from the lime or straine it through
a cloath, & for a quart of water, take an ounce
of Brasill, let it seeth till it be halfe consumed,
then put into it one ounce of beaten alum, one
ounce of gum Arabike, two ounces of gum of a
Cheritree, or else two ounces of cleane glue,
straine it from the wood : you may likewise put
into it some chalke beaten to powder. 10 15

To seeth Brasill another way.

To an ounce of Brasill, take the third part
of a quart of beere, wine, or vineger, put it in a
new pot, let it stand a night, in the morning set
it on the fire, and let it seeth till it be halfe consu-
med, then for euery ounce of Brasill, take two
penny worth of alum, beaten to powder, and as
much beaten gum Arabike, stir them wel toge-
ther, and let them seeth againe, but if you desire
to haue it somewhat darke, then scrape a little
chalke into it : when it seetheth, let it not seeth
ouer the pot, and being cold, strain it through a
cloath, and put it into a glasse well stopped. 20 25 30

A Booke of Secrets.

Another red colour.

Mingle salt and honny together in a bason, let it stand eight daies, then seeth it, and it will be a red colour.

5

Purple colour.

10

Take two pound of blew Heidleber, two ounces of alum, one ounce of ashes of copper, which you may haue at the brasiars, a pint of water, put them into a kete, let it seeth till it consume two fingers deepe, when it is cold, straine it through a clout, in a cleane glasse or pot, let it stand a while, then straine it into another pot, and let it stand till it be thicke enough.

15

To make Rosin.

20

25

Take strong vineger, or wine, and put powder of alum therein, when the alum is dissolued, then make a strong and thicke lee with quicklime, and take foure times as much Brasill as your alum waieth, put it in a clout, and hang it in the lee, and let it stand a day & a night, then straine it, and hang the Brasill again in the lee, and let it stand as long as it did the first time, which doe in like manner three or foure times, when you haue done so let it stand and drie, and it is perfect.

Another Rosin.

Take two parts red lead, one part white lead,

A Booke of Secrets.

lead, and mingle them together, or take Auri-pigmentum and red lead, of each a like quantitie, and mingle them together.

Fire colour.

Take sout of a chimney, and a little alum, 5
let them boile, then take gineper, granded with
water, and temper it together, with alum and
gum Arabike.

Tawny colour.

Take blacking, and mingle it with red lead 10
and gum Arabike.

Yellow colour.

Take hauthorne berries, gather them eight
daies after Saint Laurence day, bruse them
and put a little beaten alum vnto them, stirre 15
them well together, and let them stand one
night, and it will be a faire yellow.

Another good yellow.

Take the barke of a tree, cut off the outside,
and throw it away, cut the rest in small peeces, 20
and poure water vnto them, let them seeth two
or three times, then put pouder of alum into it,
stirre them well together, and let them seeth
again.

Another yellow. 25

Mix saffron with the yolke of an eg, and it
maketh a faire shining colour.

A Booke of Secrets.

Otherwise.

5 Put saffron and alum into a clout, and put vineger into it, and strain it out: or take saffron, the yolke of an eg, gum Arabike and alum, and mix them together.

Auripigmentum.

Take gaule of Eeles, or of other great fishes, or oxe gaule, put some vineger to it, and a little chalke, and make a paste thereof.

10

Greene colour.

15

Take the blacke berries that grow on the hauthorne tree, and gather them eight daies after Michaelmas day, bruse them, poure water vnto them, and put therein a little beaten alum, stir them well together, and let them stand two daies and a night, & it will be good greene.

A faire greene colour.

20

Take honie, put a little quantitie of vineger more than the honie is, into it, mingle it well in a leaded or a copper pot, stop it well, and set it twelue daies vnder another pot, and put there-to a little chalke.

25

Also take copper plates, put them in a copper pot, and put stilled vineger to them, set them in a warme place, till the vineger become blew, then put it into another leaded pot, poure vineger

A Booke of Secrets.

ger into it againe, let it stand so till it become blew, this doe so many times, till you thinke you haue inough, then let it stand till it be thick.

To temper or prepare Verdigreece.

Grind it with wine, and put two or three drops of honny to it. 5

To make good greene.

Take copper plates, let them lie six monthis in vineger in a warm place, then take them out, and drie them in the sun, and the flower you find vpon the plates, scrape it of, for that is the colour. 10

Blew colour.

Grind chalke with the iuice of the elder berries, straine it through a clout, put a little alum water vnto it, let it drie, and keep it til you need. 15

In the same sort you may make colour of the blew corne flowers.

Also the iuice of the blew corn flowers alone, with alum and gum tempered together, is a good blew. 20

Also mulberies boiled with alum.

Also take blew corn flowers that are not too much blowne, and gather them in a morning before the sun riseth, plucke the blew leafe, and let not any of the white come among them, and put them into a copper kettle, and hang it in see- 25

A booke of Secrets.

5 thing water, till they be drie, keepe them in a
glasse well couered. When you wil make colour
of them, then take some of the blew leaues, and
put them into a drinking glasse, poure water
into them, till it be thicke like dowe, let it stand
couered twelue houres, then presse the liquor
through a cloath into another glasse, and put a
little glue into it, and set it in a warme place, or
else in whote water, vntill it bee drie and thicke
10 to vse.

10

To make Azure.

Take one ounce of white lead, nine ounces
of Indicum, pour good vineger vnto it, put them
in a leaded dish, let them seeth well, and that
which swimmeth on the top is the colour.

Or take two parts of chalk made of egshels,
one part of Verdigreece, one part of Salarmoni-
acke, mingle them together with strong vine-
ger, put them in a new pot, stop it well, that no
20 aire issue forth, set it in a warme place for a
month long, and it will be Azure.

To temper or prepare Azure.

25 Wash it wel in cleane water, and that swim-
meth on the top, cast it away, and that which
lieth in the bottome, is good, doe so three or four
times one after another, and let the water bee
cleane poured from it, then take white of eggs,
that are well beaten, put thereto a little beaten
gum Arabike, and let it stand till the gum is
dissolved,

A Booke of Secrets.

dissolued, then put the Azure into it, and mingle them well together, straine it through a linnen cloath into an inkehorne, and vse it when you will.

A faire blew.

5

Grind the Azure with faire water very well vpon a stone, then put it in a horne or shell, and pour water theron, stir them wel together, then let them stand half a day, then pour out the water, and take the gaule of a great fish, and grind it with gum and the white of eggs, and vse it when you thinke good.

10

White colour.

To write with chalke out of a pen vpon blacke tables or paper.

15

Grind quicklime, egshels, and chalke, together with the milke of a goat.

To make chalke of egshels.

Take egshels, and let them lie three daies in vineger, then wash them well in faire water, drie them in the sun, and beat them to pouder, then grind them vpon a stone.

20

A good white colour.

Take white glasse wel beaten to pouder, put thereto some brimstone in pouder, and keepe it

25

C

in

A Booke of Secrets.

in a pot wel couered, set it vpon a soft fire, til it be red hote, then let it coole, and grind it on a stone.

Gold colours.

To make Aurum Musicum.

5 Take one ounce of Salarmoniack, one ounce of
quick siluer, one ounce of Conterfein, halfe an
ounce of brimstone, bruse the brimstone, set it on
the fire, but let it not be ouer hote least it bur-
neth, or become black, then take the Salarmoni-
10 ack, & the quick siluer, being in pouder, mix them
wel together, then mingle them with the brim-
stone, stir them well & quickly with a sticke, till
the brimstone becommeth hard, then let it cool,
15 grind it on a stone, and put it in a glasse with a
long neck wel stopped with luttum, and set it in
a pan with ashes, make a fire vnder it, and let it
stand halfe a day, in such maner, not ouer hote,
till a yellow smoke riseth vpon it, and when the
yellow smoke is gone, then it is prepared.

20

Otherwise.

Take an ounce of Cin, melt it in a pot, put in-
to it half an ounce of Tartarum, & one ounce of
quick siluer, stir them together, till it bee hard, &
congealed into a cake, then grind it well vpon a
25 stone, put to it one ounce of beaten Salarmoni-
ack, mix them wel together, the melt one ounce
of brimstone, but make it not too hote, poure the
ground pouder into it, stirre it well vntill it bee
hard, let it coole, and doe as before is said.

30

You must temper it thus.

Grind it well, wash it wel in clean water out
of

A booke of Secrets.

of one mussell shell into another, till it bee very cleane, then put it into a pewter pot, put some gum water therein, stir it about, and write therewith, let it drie, and polish it.

Argentum Musicum.

5

Melt an ounce of Tin, & put thereto an ounce of Tartarum, an ounce of quick siluer, stirre it well til it be cold, beat it in a mortar, then grind it on a stone, temper it with gum water, & write therewith, then polish it.

10

To write a gold colour.

Take a new laid hens eg, make a hole at the one end of it, and let the substance out, then take the yolk of an eg, without the white, and foure times as much in quantity of quick siluer, grind them well together, stop the hole of the egshell with chalke & the white of an egg, the lay it vnder a hen that sitteth with six eggs more, let hir sit vpon it three weekes, then breake it vp & write therewith, some say it must bee laid vnder three seuerall hens, and vnder each hen three weekes.

15

20

To write with gold out of a pensill.

Take hony & salt a like quantity, grind them wel, put to it a leaf of gold with a little white of an eg, put it into a mussell shel, and let it purifie, temper it with gum water, & write therewith, let it drie, and polish it with a tooth.

25

Or grind saltstone well with the white of an eg, put into it a leafe or two of gold, and write therewith as before.

30

Or grind a leaf of siluer or gold very smal with gum water, and wash it in a mussell shell as aforesaid.

A Booke of Secrets.

To write all mettals out of the pen.

5 Grind cristall well, temper it with gum water, or the white of an eg, write with it, then let it drie, then take the mettall, which you wil, and rub it vpon the letters writen, till the letter bee well coloured with the color of the mettall, then polish it with a tooth.

10 Or take cristall and pomestone, both ground very small, put thereto a little verdigreece, beaten likewise to pouder, and put them all into a leaded pipkin, set it vpon a soft fire, but let it not bee too hote, let it not stand so long on the fire, that it becommeth as blacke as a coale, then grind it on a stone, temper it with gum water,
15 write with it as aforesaid.

A good gold colour.

Take linseed oile, put into it a little Aloe Epaticum, and alum, let them seeth well in a leaded pot.

20 To lay gold vpon any thing.

Take red lead, temper it with linseed oile, write with it, and lay gold vpon it, so let it drie, and polish it.

25 Or lay gum Arabike in vineger, so long til it waxeth white, take it out and put it into the white of eggs, till it melteth, write with it, when it is almost drie, lay the gold vpon it, then let it stand one night, and polish it.

To

A Booke of Secrets.

To lay gold vpon glasse.

Grind chalke, and red lead in like quantity together, with linseed oile, lay it on, when it is almost drie, lay your gold vpon it, and being well dried, polish it.

5

End of the colours.

How to graue in yron and steel, or in other mettals with strong water.

For as much as that euery man in this our age, is giuen to write, learne, and practise all manner of arts, I am of opinion it will not be vnprofitable vnto such as are desirous to learn, if I set somewhat before them that may teach them to write letters, and graue any other thing in steele, yron, or other mettals, which I willingly present vnto them, although it be but a small matter, if it be profitable vnto them, I wish them to vse it.

10

15

Take two parts of verdigreece, one part of common salt, beat it in a mortar, put thereto sharpe vineger, and when you will graue, anoint your plate first with red lead tempered with linseed oile, let it drie, this substance lay vpon the plate, and the warmer the place is, when it lieth, the sooner it wil eat in, and when it is drie, take away the pouder, and make the plate cleane againe.

20

25

Or take two parts victriall, one third part

C 3

Salarmoniack,

A Booke of Secrets.

which doe for the space of a quarter of an houre, then rub it off with ashes or vnsleact lime, but be sure that the places you will eat into be all well couered with red lead.

To colour quilts and parchment of diuers colors.

5

Take the quilts, & cut away the fethers, and rub thē wel with a wollen cloath, that the skin go clean off that the quilt may be smooth, which must alwaies be done before you die thē, cut off a little of the end of the quilt that the colour may enter into the, lay them in alum water, for halfe a day, take them out & drie them, then die them, when they are died, as I will teach you, let them be wel dried, and strike them ouer with a cloath betweene two fingers, then stick them in a bord that is full of holes, and let euery one haue a space betweene it, that they touch not together and drie them in the aire.

10

15

To die quilts greene.

Take two parts verdigreece, a third part Salarmoniacke, grind them well together, steepe them in strong vineger, and put the quilts into it, and couer them close, let them lie therein till they be green as you desire to haue thē: you may die likewise bones & wood in the same manner, lay the quilts, wood, or bones, in a leaded pot, poure vineger vpon them, wherein Greekish green is mixed, couer it, and set it seuen daies or more vnder warme horse dung. You may al so temper verdigreece with vineger, till it be somewhat drie, put the quilts into it, let them lie long therein, then take them out, & put them in

20

25

A Booke of Secrets.

5 warm horse dung, & let them continue therein
eighteene daies together: you may die red quil
in that sort and make them greene, also take
strong vineger, put it in a copper pot, or kettle,
put verdigreece into it, let it stand til it be green,
put the quil into it, & let the lie til they be green.

Red quil.

Seeth the in Brasil, as before you are taught,
hauing first laid them in alum water.

10

Yellow quil.

Seeth them in yellow colour, as before you
are taught what you shall do with the barke of
aple trees.

Blacke quil.

15

Seeth beaten gaules in strong vineger, lay
the quil in it, and let them seeth likewise, then
lay them in the white of eggs, and put vnto them
the green pils of walnuts, and let them seeth all
together.

20

To colour parchment and velim of diuers colors.

25

Take as much parchment or velim as you
will, and fasten it at the corners and sides with
nailes vnto a bord, with the smooth side out-
wards, annoint it then with what colour you
will, be it yellow, blew, red or black, such as you
find set down in this booke, let it drie well, then
stroke it ouer, and let it drie in a place, where no
dust is stirring.

FINIS.

NOTES.

21. Though the title page is copied in full, I have not reprinted the second section about wine, as it has nothing to do, either as regards subject or origin, with the books at present under consideration.

The original pamphlet is not paged, and reference to it, is, therefore, possible only by the signatures. The numbers, printed on the margin of the pages, indicate the lines, and have been added by me for convenience of reference in these notes.

The present reprint is not a facsimile, for the tract is in black letter, but it corresponds page for page and line for line with the original.

The British Museum copy is cut rather close at the foot of the title-page, so that only the upper part of the figures composing the date, 1596, appears. Unfortunately it has been omitted altogether from the photographic reproduction.

It may be noted that the translation is not literal, but is a good deal condensed, and that words and phrases, sometimes of importance, are not unfrequently omitted, but on the whole it is fairly accurate and useful. As I have shown in Supplement III. § 12. sqq., the translation was not made from the original (nor from that of 1532, above, § 5), but from one of the later editions.

- | | | |
|-------|-------|--|
| A3 v. | l. 7 | The German is 'sauber,' i.e. 'sifted <i>clean</i> ,' omitted in the translation. |
| | l. 13 | German: 'fünfften,' <i>fifth</i> day, not <i>first</i> . |
| | l. 21 | German: 'sauber,' i.e. 'another <i>clean</i> pot,' omitted in the translation. |
| | l. 21 | After 'pot' the clause is omitted: 'Let it run through of itself and do not wring the cloth.' |
| | l. 24 | After 'daies,' add: 'but stir it at intervals.' |
| | l. 25 | German: 'so seihe es ab,' 'strain it off,' rather than 'pour it out.' |
| A4 r. | l. 7 | German: 'eng glass': 'a strait glass,' omitted in the translation. |
| | l. 11 | 'wel leaded.' The German is 'verglassten,' 'glazed.' This translation is given throughout the tract. I |

- can find no other instance of this use of the word 'leaded.'
- l. 14 The clause: 'but suffer . . . pots brim' should be in parentheses.
- l. 16 'leaded,' see above, l. 11.
- l. 18 'straine it through.' The German is 'press it out.'
- l. 20 'matter.' The German is 'Brü,' 'infusion,' or 'extract.'
- l. 21 'mix them intimately.' In the original text it is 'grind and mix them intimately.'
- A4 v. l. 28 'a little quantitie.' The German is 'of these two waters take an equal quantity.'
- A4 v. l. 9 'soft fire.' The German is 'zum koln feür.' This translation of the phrase is given throughout the tract.
- l. 19 'consumed.' German, 'zergangen,' 'dissolved' or 'melted.'
- l. 20 'cup of victriall'; German: 'lot,' 'an ounce of victriall' (i.e. green vitriol, or ferrous sulphate).
- B1 v. l. 2 'a small peece of Alum.' German: 'einer erbis gross Alaun,' i.e. 'a bit of Alum the size of a pea.'
- ll. 3-4 Between these lines in the editions of 1532, 1537, and 1563, there is another receipt for making ink, as follows: 'boil for an hour alder tree buds cut small, powdered vitriol and beer. When cold strain through a cloth and add powdered galls and a little alum, stirring the whole well.'
- l. 17 'or a candlestick.' These words have no equivalents in the original text.
- B1 v. ll. 20-21 In the translation a receipt for making ink in a hurry is omitted. It consists in immersing a well-worn blue whetstone in milk and rubbing well-burnt charcoal on it until the milk is black enough. This ink does not keep. Another method is to take whey, put into it hammer scales and the fine sand from a grind stone, then as before rub charcoal on a whetstone.
- l. 21 The title of this receipt in German is: 'to keep ink from drying up and turning mouldy, and to prevent moths and mice from gnawing the paper.'

- l. 25 'The German words are 'outside rough husks.'
- l. 26 'The German is: 'so dorret sie nicht ein,' 'it does not dry up'; the translation is: 'and it will not sinke through the paper.'
- l. 26 'tino' is an original misprint for 'into.'
- B1 r. l. 1 'And that it may not come off' is W.P.'s rendering of the words: 'Das sie aber nicht schimlig werde,' i.e. 'that it may not become mouldy.'
- l. 3 'The word 'moths' has been omitted after 'nor.'
- l. 6 'that it may not be seen.' The German is: 'das mans nicht lesen kan,' 'that one cannot read it.'
- l. 7 'wet with water,' should be 'wet with *a* water.' The German is: 'ziehe es dam durch ein wasser.' The water is a watery extract of galls.
- l. 12. 'when you will read it.' The German is: 'So du oder ein anderer das will lesen.' 'You or another.'
- l. 16 'into a cleane pot.' The German adds 'nach der grösse des brieffs,' 'according to the size of the paper.'
- ll. 18-19 A receipt is omitted: 'To make a black letter with white writing.' Mix yolk of egg with water and write with it. When dry wash the whole paper with ink. When it is to be read scrape the paper with a knife and the writing will appear white on a black ground.
- l. 29 'The German is 'alumen plumosum.'
- B2 r. l. 3 For 'colour' read 'colours.'
- l. 5 'The word 'element' is here used in its old meaning of the sky or air. The German word is 'himmel.'
- l. 9 At the end insert the words 'clear supernatant.' 'Let it stand over night, in the morning strain the clear supernatant part off through a cloth,' is a stricter rendering of the original.
- l. 11 for 'a quart of water' read 'a quart of the water.'
- l. 12 read 'of Brasill wood shaved.'
- l. 21 read 'let it stand a night on the wood.'
- l. 24 'penny' is here the translation of 'pfennig.'
- l. 27 'darke.' The German is 'braun,' which is a specific colour.

- ll. 28-30 The last clause is more precise in the German :
 ‘as soon as it has boiled, and see that it does
 not run over when you put in the chalk, when
 it has grown cold, strain it off and put it in a glass
 or clean jar, which can be closely stopped
 above.’

Between this receipt and the next one there are
 two others for making a red colour with Brasill in
 the 1563 edition, but they are not contained either
 in the 1532 or 1537 edition.

- B2 v. l. 6 ‘Heidleber’ is a transformation of the German
 Haidelber, or Heydelbeer, bilberry, which ap-
 parently the translator did not know.

l. 11 For ‘straine’ read ‘press.’

l. 12 ‘let it stand awhile,’ add : ‘till it settle.’

l. 13 Insert ‘clean’ before ‘pot.’

l. 14 ‘Rosin,’ or ‘Roszin’ in German means ‘crimson.’
 I do not know whether it ever had the same
 meaning in English, or whether the translator has
 simply used the German term for want of an
 equivalent.

- B3 v. l. 4 This receipt is not complete: ‘Take soot, meth-
 wertz (honey and water), alum, boil them up, add
 cinnabar ground with water, mix them all together
 with alum and gum arabic.

Methwertz is literally ‘mead wort.’ It is omit-
 ted in the translation.

The German is ‘Cinober,’ or ‘Zinober,’ cin-
 nabar, here translated ‘gineper,’ which, according
 to Murray, is ‘juniper.’ He gives no example of
 the present use of the word.

I have found no authority for ‘granded.’

- l. 9 The first part of the receipt for a brown or tawny
 colour is omitted: ‘Take boiled Brasill and white
 vitriol, mix them and boil them well.’

In the 1531 and 1563 editions the reading is
 ‘Galgenstein,’ in that of 1537 it is ‘Galitzenstein,’
 ‘white vitriol.’ The word ‘Galgenstein’ is not
 in any dictionary of old or modern German,
 which I have consulted.

- B₃ *r.* l. 19 Read: 'take the bark of apple trees.' Compare note on C₄ *v.* l. 13.
- B₃ *v.* l. 2 'inco' is another original misprint for 'into.'
- B₃ *v.* l. 16 The German is 'zwo nacht vnd tag.'
- ll. 16-17 Here is omitted a receipt: 'To keep sap green for a year.'
- l. 17 'A faire greene colour.' This receipt was fully discussed in Supplement III. §§ 12-17.
- ll. 20-26 'leaded,' meaning 'glazed.' See A₄ *r.* l. 11.
- l. 23 'copper plates.' The German is 'Feihelspen,' or, 'Feyhlspen vom kupffer,' i.e. 'copper filings.'
- B₄ *r.* Two or three short receipts for making green colours are omitted. They are as follows:—
- ll. 3-4 Indigo and orpiment ground together make a green.
- Verdigris ground with vinegar, in which saffron in a cloth has been steeped, and the yellow colour extracted and mixed with gum water, makes a good light green.
- ll. 6-7 Grind verdigris with juice of rue, put it in a copper vessel, mix with vinegar and add a little yolk of egg to keep it from running.
- l. 7 Instead of 'good greene,' the title should be 'Greek greene.'
- B₄ *r.* ll. 18-19 Here is omitted a receipt to make a blue colour with Alum and the juice of elder-berries, or dane-wort berries.
- ll. 22-23 Also by boiling bilberries and 'Metwertz' together.
- B₄ *v.* l. 2 'well couered.' The German is 'oben verstopffet.'
- l. 14 For 'leaded' read 'leaden.' The German is 'in ein bleien Schüssel.' Here it does not mean 'glazed.'
- C₁ *r.* l. 5 The German title is: 'Zu schönen Blumen.'
- l. 16 The German is more detailed: 'unslaked white lime, lime from eggshells, chalk, grind them together with the milk of a goat.'
- C₁ *v.* l. 1 'Soft fire'; German, 'ein kolenfewr.'
- See A₄ *v.* l. 9 and note.
- C₁ *v.* l. 15 The translation is not accurate: 'thus dann in ein glass, mit einem langen Hals, verkleibe das glass vmher mit gutem leymen, und setze es in

ein scherben mit äschen, mache ein fewr dar-
under,' &c., i.e.

'put it in a glass with a long neck, plaster the
glass all round with good lute, and set it in a
potsherd in ashes, make a fire under it,' &c.

l. 21 'Cin' is a misprint for 'Tin.'

l. 22 'Tartarum.' The German is 'Wissmat,' 'bismuth.'
See C3 v. l. 23.

C2 v. l. 2 'a pewter pot.' German: 'ein zinnen hörnlein,'
'a little tin horn.'

l. 7 'Tartarum,' 'wissmat.' See C1 v. l. 22.

C2 v. l. 25 'let it purifie.' The German is more exact:
'streichs biss du nichts vnreyns darinnen findest,'
'strain it till free from all impurity.'

C2 v. & v. In the 1563 edition there is a receipt to write
with gold and silver out of the pen another way,
which is not in the 1531 and 1537 editions or in
the English translation.

C2 v. l. 12 'The translation is defective: 'Take a fresh hen's
egg, make a hole at each end and blow it,
then take the yolk of another egg without the
white, and the fourth part as much of quicksilver,
grind them well together, close one of the holes
with lime and the white of an egg, set it under a
hen with six other eggs, let her sit on it for three
weeks, &c.

But the author neglects to say that the mixture
is to be put into the empty eggshell, before it is
laid under the hen. This curious receipt was
quoted in my first paper, (1888, § 3).

C2 v. l. 28 'Saltstone.' In Supplement III. § 9 under this
word I indicated that in translating 'Saltzsteyn'
'saltstone,' W.P. had made a mistake for 'rock-
salt.' I am not certain now that the criticism
was justified, but, whether or not, it is a more con-
fused piece of nomenclature than I was aware of.
In the first place 'stein-salz' is 'rock-salt,'
natural crystallized salt which is mined, as at
Wieliczka. In the second place 'salzstein'
according to Benecke and Lexer is equivalent to

‘salzkrystall,’ which I take it is much the same as the preceding. But it is also equivalent to ‘Pfannenstein,’ that is the stony deposit or incrustation which forms in the pans when the salt is boiled and which consists of difficultly soluble salts of lime and magnesia with other impurities. It is not quite plain in which sense the word is used in the present receipt, and whether the translation is correct or not. Now, according to Murray, the word ‘saltstone’ is equivalent to ‘salzstein,’ and signifies ‘rock-salt,’ as he illustrates by various quotations. Again, if ‘saltsteyn’ in the receipt meant ‘rock-salt,’ W.P. was correct in translating it ‘salt-stone,’ as that was a current English word. But if it denoted ‘Pfannenstein,’ which is apparently the common use of the word, then ‘saltstone’ was not a satisfactory rendering of it. Perhaps the translator did not know there was any difference.

C2 v. ll. 7-8 Between these lines another method is given in the 1531, 1537 and 1563 editions, but omitted in the English :—

‘Take tripoli with which the barbers rub their basins, and sugar Benit or candy: grind them with warm gum water, write with it, let it dry, and then rub it with the metal as above said.’ The word ‘Benit’ is Middle-German for a species of barley sugar, made by concentrating honey till it forms a stick or rod.

l. 11 ‘leaded pipkin,’ German: ‘verglassten;’ ‘soft fire,’ German: ‘kolenfewer.’

C2 v. l. 12 The translation seems to be the reverse of the original: ‘setz es auff ein kolen fewr, thu jhm nit zu heyss, röste es wol, biss es schwartz würt wie ein kol, reibs dann vff dem stein,’ &c. the direction being to roast it well till it grows as black as a coal.

l. 18 ‘leaded pot,’ German: ‘verglasten hafen.’

l. 20 After 20 is a receipt in the 1531, 1537 and 1563 editions, omitted in the English version :—

Take strained, or liquid, or virgin honey (honigseim) mix it with glue and write with it. Let it dry a little, then lay silver or gold on it and when quite dry, polish it.

- C₃ r. ll. 9-18 This paragraph is not a very close rendering of the original. It is printed in the 1531 and 1563 editions but not in that of 1537. In the translation the first paragraph about etching has been shortened and differently arranged so that it has become unintelligible. Shortly it is as follows:— Make a thick paste of lime-tree charcoal, vitriol, and salammoniac with vinegar. Then sketch or write what you wish to etch with red lead and linseed oil and let it dry. Then lay on the paste about as thick as the little finger, and heat it, short of burning it. When it is quite dry rub off the powder, and wipe the picture.

Another mixture was vitriol, alum, zinc sulphate, vinegar, salt and linden charcoal.

- C₃ v. l. 6 The punctuation here is wrong. Instead of 'Mercurie, sublimated victriall,' read 'Mercurie sublimated, victriall.'

- C₃ v. l. 14 The punctuation here is most misleading. After "longer" there should be a full stop and then a new paragraph should begin and run thus:

If you will grave any sunk writing or carving, then spread the iron or steel with a thin layer of wax, write with an awl or bodkin (Pfriemen) in the wax down to the metal, pour the water on it and it eats its way in.

- l 23 'Tartarum,' read 'tartar,' German 'Weinstein.' W.P. uses the word 'tartarum' for two absolutely different substances. See C₁ v. l. 22.

- l. 27 The translator has omitted from the original the words:—

'and that which you mean to etch and is to be raised or in relief, draw with linseed oil and massicot (Bleigelb), let it dry,' &c. as in the translation.

- l. 29 'leaded,' German is 'glazed.'

- C4 r. l. 3 'The conclusion of this receipt is not satisfactory; it may run thus: 'afterwards rub it off with ashes or unslaked lime, taking care that what you are etching is covered with the massicot, in all directions where it should be entire.'
- l. 6 'cut away the fethers,' 'with a sharp knife' is omitted.
- l. 7 the German is: 'that the skin of the quill be quite clean and smooth.'
- l. 14 'strike them over with a cloath betweene two fingers.' The German is: 'spread on them a very thin coat of painters' varnish between two fingers.'
- l. 18 'in the aire,' 'in a place where there is no dust,' is omitted.
- l. 26 'leaded,' German: 'glazed.'
- l. 27 'Greekish green.' See B4 r. l. 7 and note.
- l. 28 after 'mixed,' add: 'provided it is not made too thin with the vinegar.'
- C4 v. l. 1 after 'warm' add; 'and moist.'
- C4 v. l. 13 'aple trees.' See B3 r. l. 19 and the note.
- l. 18 'green pils of walnuts.' The German is: the 'juice of walnut shells.'
- l. 23 'vnto a bord.' The German is 'ein schlechtes brett,' 'a smooth board.'
- l. 25 before 'yellow,' insert 'green.'
- l. 27 'stroke it ouer,' add 'quite thin with painters' varnish.'

22. To ensure accuracy and facilitate comparison, phototypes are here added of the title-pages of three of the editions which have been described in previous papers. They may be either kept here together, or distributed in the volumes of the *Proceedings* where the descriptions occur. They are as follows:—

1. 'Rechter Gebrauch d' Alchimei,' 1531. *Proceedings*, 1888, vol. xix., p. 126.
2. 'A profitable Book,' 1583. *Proceedings*, 1888, vol. xix., p. 148.
3. 'En liden dog konsterig Bog,' 1648. *Proceedings*, 1894, vol. xxv. p. 233.

There are two or three other editions of which I hope to give similar facsimiles on a future occasion.

Rechter Gebrauch d

Alchimei/ Mitt vil bißher verborgenen/ nutzbaren vñnd
lustigen Künsten/ Mit allein den fürwitzigen Alchimis-
misten/ Sonder allen kunstbaren Werckleuten/
in vñd aufferhalb feurs. Auch sunst aller
menglichen inn vil wege zuge-
brauchen.

Die Character/ figürliche bedeutungen/ vñd namen der Me-
tall/ Co:pus vñd Spiritus.

Der Alchimistischen verlateinerten wörter außlegung.

Register am folgenden blat.





A profitable booke
declaring dyuers approoued re-
medies, to take out spottes and staines, in Silkes,
Veluets, Linnen and Woollen
clothes.

With diuers colours how to die Vel-
uets and Silkes, Linnen and Woollen, Fustian
and Threade.

Also to dresse Leather, and to co-
lour Felles. How to Gylde, Graue, Sowder, and Ver-
nishe. And to harden and make softe
Yron and Steele,

Very necessarie for all men, speciall ye for those
which haue or shall haue any doinges therein; with
a perfit table herevnto, to fynde all
things readye, not the like reucaled
in English hereto-
fore.

TAKEN OVT OF DVTCH,
and englished by *L. M.*



Imprinted at London by Thomas
Purfoote, and William Pounsonbie,

1 5 8 3

731940

En liden dog konsterig Bog
Om adskillige slags

Farffve oc Blect.

Hvorledis mand skal farffve Træ /
Been / Zern / Tin / Glas / Byrster / Klæde / Sil-
de / Skind oc Ledder / saa om adskillige slags Farffve at
berede / at skriffve oc male med.

Alle Skriffvere / Malere / Billed-
huggere / Indleggere / Smedickere / Beendrey-
ere / Fellberedere / Farffvere / Skomagere oc an-
dre som til saadane Lyst haaffver
til Tieniste.

Paa Tydske Tungemaal først sammenskreff-
ven aff den vjebørpante / velforsarne
Mand

ALEXIO PEDEMONTANO.

De nu meenige Mand til beste oc Tieniste paa
vort Danske Sprog transfereret, udsat oc til
Trycken forfærdiget.

Prentet i Kiøbenhaffn / Aar 1648.

Aff Peter Hake.

Paa Jørgen Holstis Bogh. Bekostning / oc findis
hos hannem tilkiøbs.



SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

SUPPLEMENT V.

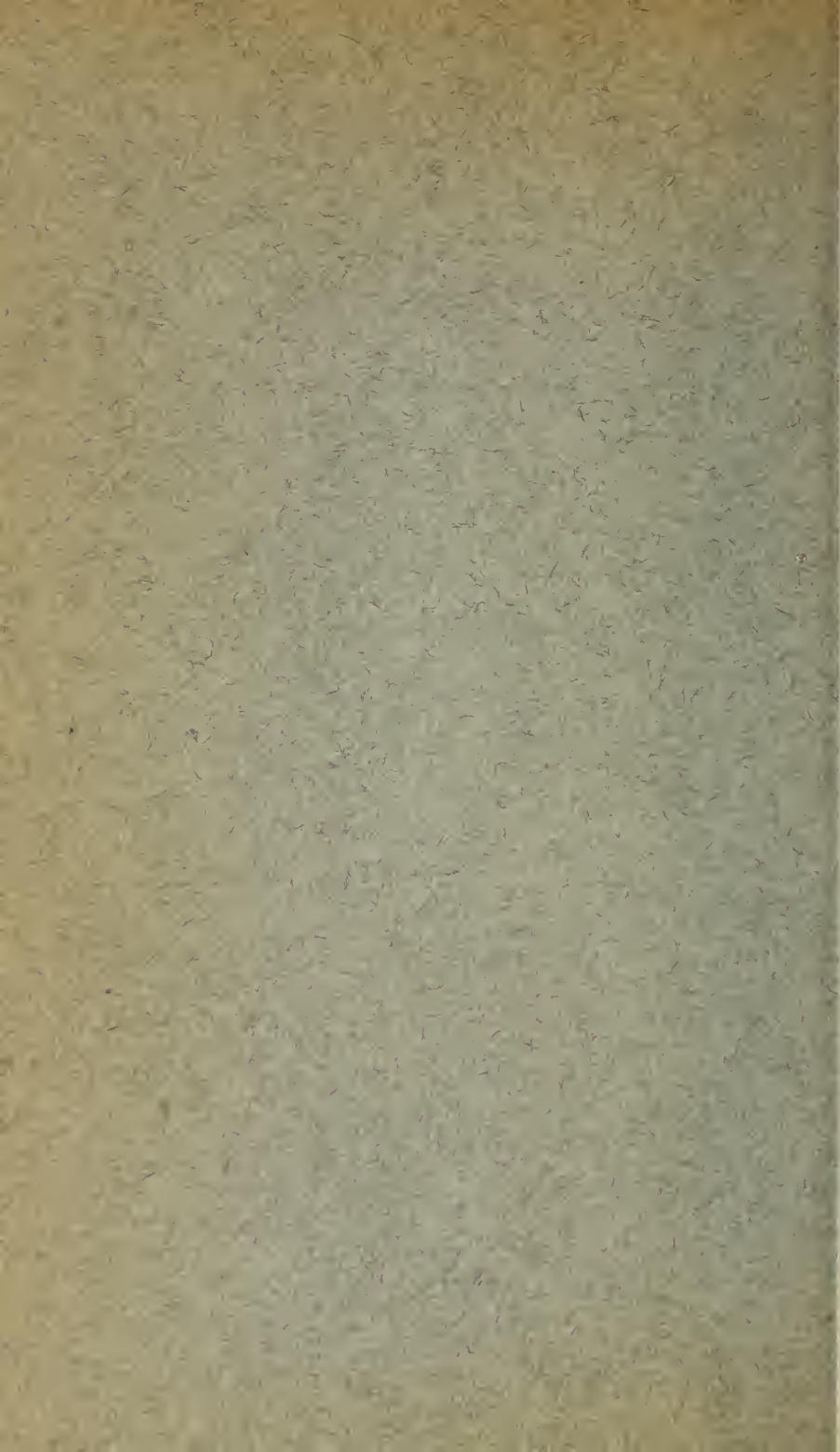
BY
JOHN FERGUSON, LL.D.,

ÉMERITUS PROFESSOR OF CHEMISTRY,
THE UNIVERSITY OF GLASGOW.

GLASGOW :

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW.

1916.



SOME EARLY TREATISES
ON
TECHNOLOGICAL CHEMISTRY.

SUPPLEMENT V.

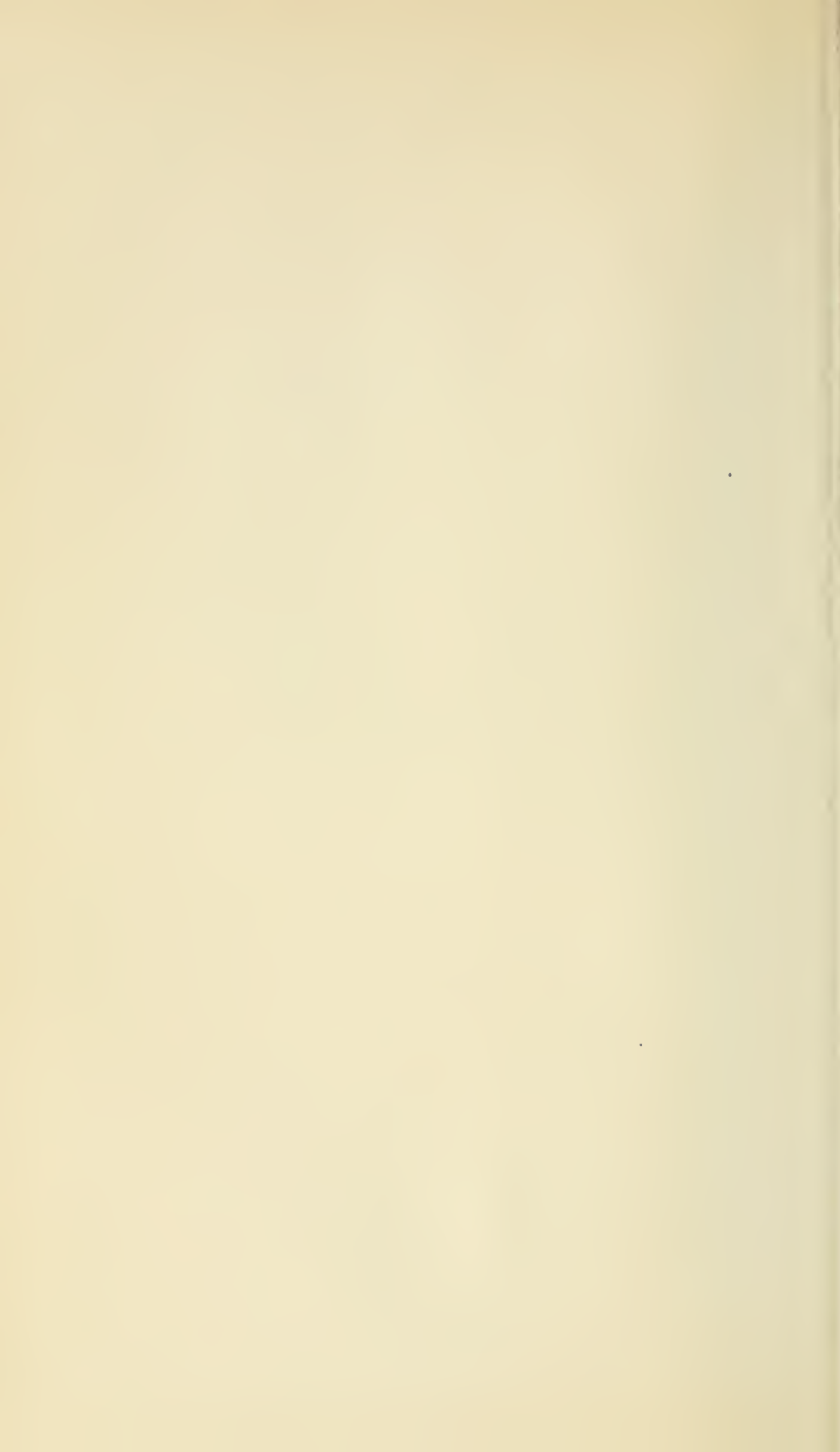
BY
JOHN FERGUSON, LL.D.,

EMERITUS PROFESSOR OF CHEMISTRY,
THE UNIVERSITY OF GLASGOW

GLASGOW :

PRINTED FOR THE ROYAL PHILOSOPHICAL SOCIETY
OF GLASGOW.

1916.



Some Early Treatises on Technological Chemistry. Supplement
V.¹ By Professor JOHN FERGUSON, LL.D.

[Read before the Society, Wednesday, 9th February, 1916.]

1. In the second of these supplements, §10,² reference was made to "A profitable booke declaring dyuers approoved remedies, to take out spottes and staines," translated out of "Dutch," by Leonard Mascall. Six editions were enumerated, of which three had been previously described from copies, the remaining three were taken from catalogues.

2. One of the latter was dated 1588, and the only account of it that could be obtained was given by Maunsell and by Hazlitt.

3. Quite recently I found a copy of it in the Hunterian Library, and I take this opportunity of comparing it with the others. It will help to complete the list.

¹ It may be observed that a portion of the material in this paper was gathered more than twenty years ago, and all of it before 1914.

² *Proceedings of the Royal Philosophical Society*, 1909-10, xli., p. 120. For some account of Mascall and his works, see *Transactions of the Archaeological Society*, N.S., Glasgow, 1915, VII. Pt. 1. "Notes on . . . Books of Secrets," § 6.

4. The title page and style of the 1588 edition are similar to those already described. The title is as follows :—

A profitable booke declaring dyuers approoued re-

medies, to take out spottes and staines, in Silkes,

Veluets, Linnen and Woollen

Clothes.

With diuers colours how to die Veluets

and Sylkes, Linnen and woollen, Fustian

and Threade.

Also to dresse Leather, and to co-

lour Felles. How to Gild, Graue, Sowder, and Ver-

nishe. And to harden and make softe

Yron and Steele.

Very necessarie for all men. specially for those

which hath or shall haue any doinges therein with

a perfite table hereunto, to finde all things

readye, not the like reuealde in Eng-

lise heretofore.

TAKEN OVT OF DUTCHE,

and englished by *L. M.*

[Ornament.]

¶ *Imprinted at London by Thomas*

Purfoote, dwelling in the newe

Rentes. 1588.

Small 4. A to L in fours (L4 blank) ; or pp. [2] 78 [6, 2 blank], Black letter : but most of the title and the headings of the paragraphs are in roman. Two ornamental capitals. The pages are numbered *Fol.* instead of *Page.*

A1 Title : A2 to K4 Text ; L1 3 Table : L4 blank.

5. As this concludes the tale of editions at present known to me, attention may now be directed to certain topics which have arisen in the course of the research, but have not been discussed. Even supposing that some of the involved problems cannot yet be solved, it will be convenient to have them enunciated, so that they can be disposed of when the facts have been ascertained.

6. One of the topics is the existence of a number of books, which, though not belonging to the two series hitherto dealt with, are, nevertheless, linked to them, not only by similarity or identity of theme, but by containing several of the actual receipts.

In my attempt, therefore, to produce as complete a view of the subject as practicable, these books cannot well be passed over. Besides possessing intrinsic interest, they exhibit the vitality of some of the receipts. These reappear in collections long after the time when, so far as one can conjecture, they were first published, the little manuals which originally contained them having been superseded by more modern compilations. On examining these later gatherings, receipts recur word for word, or with unessential alterations only, for by long experience they had been proved convenient for their purpose, they supplied a want, and the easiest thing to do was to transfer them bodily to the new books.

7. The authors and works which are now to be examined are the following:—

- I. Valentin Boltz, *Illuminirbuch*, 1547.
- II. Andreas Helmreich, *Kunstbüchlein*, 1567.
- III. Carolus Battus, *Secretbocck*, 1594.
- IV. *Das wohl zubereitete Tintenfass*, 1732.
- V. *Der vollkommene Fleckenkünstler*, 1797.

They stretch, therefore, over some two hundred and fifty years, but it is possible that the lists following do not include all the editions, or all the works on the subjects, published during that interval. If there be others they can be fitted into their niches when they are known.

The present tracts may be taken in order of publication, though—except No. IV.—they are not reprints, or derived from or supplemental to one another, for, excluding the receipts which are common to them, they differ essentially.

I. VALENTIN BOLTZ.

8. The earliest dated tract is that on illumination, or painting in miniature, by Boltz. It has one or two noteworthy points besides its authorship: in particular its date, which makes it nearly contemporaneous with the original series, although not belonging to them. It is an independent production, but it is in touch with them, as will be shown.

Valentin Boltz was a man of some distinction and of undoubted energy and ability, for he was a scholar, a popular preacher, dramatic author and actor, and an artist, skilled in the preparation and use of colours. It is his tract on this subject that finds a place for him here. A word, or two, however, may be said about the man himself.

9. He was a native of Rufach³ in Upper Alsace, a small town on the Ombach, south of Colmar, and about halfway to Mühlhausen.

It has had a stirring past, and it is not impossible that it may have its former experiences, but intensified, over again before its future is decided. Though I have not ascertained the year of his birth, it must have been in the early part of the sixteenth century.

10. He is first heard of as Diaconus at Tübingen, and in 1539 as the translator into German prose of the Comedies of Terence, thus showing even then his liking for the drama. According to

³ He calls himself Boltz von Ruffach, possibly to avoid confusion with an old noble family of the same name in Silesia.

Ruffach or Rufach (called Rubeaquum, Rubeacum, Rufacum, and Rufiana) belonged to the bishop of Strasburg, but in spiritualities to the bishop of Basel. King Dagobert built there the castle of Isenburg, or Eisenburg, one of the oldest in Alsace and often the residence of the Merovingian kings. Both it and the town were harried with fire and sword by the Emperor Henry IV., and again by the Emperor Philip. In the war between the rival Emperors, Adolph and Albrecht, the town was besieged by the former, but it made so stout a resistance that he had to withdraw on the advance of Albrecht. In 1634 it was stormed by the Swedes, but taken again by the Imperialists. In 1635 it was captured by the French from Colmar. Theft was punished at Rufach with such vigour that the common saying was that "the old gallows at Rufach does not want for stout oak." It must have been something like the kind gallows of Crief. A modern castle has been erected on King Dagobert's old foundations. The district was called Mundat, or Munus datum, because it was given in 640 by Dagobert to the diocese of Strasburg. See Zedler, *Grosses Universal Lexicon*, Leipzig u. Halle, 1742, xxxii., 1521-22.

a German critic⁴ he is not a great translator, but on account of his wide views as to the importance of translation for the mother tongue and the spiritual value of the works of the ancients, is worthy of the highest esteem. He quotes the passage in which Boltz vindicates his right, even though a servant of the Church, to translate such plays as those of Terence. Boltz says that from Terence, and Plautus, and Virgil, he had learned to understand the "Latin Evangelium," *sacra ex profanis*. For as God hath given us the fine arts through the heathen, who so despises art, despises God the giver, and then Boltz blames the Germans for neglecting their own language, which certainly was crude enough then.⁵ Degen had a great opinion of Boltz, even though he admitted that his diction was rough.

11. As its readers were unconscious of this defect, the translation was successful. It appeared first in 1539, without place, but probably at Tübingen; then in 1540, there;⁶ in 1544, 1559, and 1567. Degen gives a specimen of the translation.⁷

In 1546 Boltz was preacher—Spitalprediger, or Spitalpfarrer—at Basel, and his earliest play, "Paul's Conversion," was put on the stage in the same year. An account of this event is given by Pastor Johann Gast in his *Tagebuch*, or diary.⁸ He also expresses a rather unfavourable criticism of Boltz as a preacher and of a sermon he delivered on Ascension day (May 10th), 1548, and complains that in the sermon he advanced nothing worthy of a

⁴ Johann Friedrich Degen, *Versuch einer vollständigen Litteratur der deutschen Uebersetzungen der Römer*, Altenburg, 1794-97. Part II., pp. 460-463.

⁵ It has not improved much since then, for not so long ago George Borrow, not an unqualified judge, could still call it "the most uncouth speech in Europe."

⁶ Adelung, in his continuation of Jöcher's *Gelahrten Lexicon*, Leipzig, 1784, I. col. 2010, quotes the translation, but the title he gives does not seem exact. The following version is fuller:—

Publii Terentii Aphri sechs verteutschte comedien auss eygen angeborner Lateinischen sprach. auffs trewlichst transferirt. Getruckt zu Tübingen von Ulrich Morhart. 1540. 4^o.

⁷ A German translation of Terence had been printed at Strasburg by Grüninger in 1499, probably before Boltz was born.

⁸ Edited by Buxtorf-Falkeisen, Basel, 1856.

learned man. If one may judge by the quotations given, it must have been a sermon to the people, in the people's language, with illustrations and appeals that the people could understand and respond to. Boltz, possibly, had his own opinion of his contemporaries as they of him, but whether they approved or not, he played to his audience in the pulpit, as well as on the boards, and he was apparently fully appreciated in both rôles, for crowds went to the sermon.

12. His greatest literary work was the drama, "Weltspiegel," the "Mirror of the World," which was acted on 11th and 12th May, 1550. The characters—mostly allegorical—amount to 158, and the play is a sort of satirical review of life as it then appeared. It was printed the same year⁹ at Basel by Jacob Kündig, and again in 1551. A new edition appeared in 1891.¹⁰

Boltz's third play, the "Anointing of David," was performed in 1554, and was published in that year. It is a dramatized version of the history of Saul and David, and it also involves a large number of actors, amounting to sixty-two.¹¹

⁹ The first edition, 1550, is of the utmost rarity, the only copy known, apparently, being that described by Brunet, *Manuel du Libraire*, Paris, 1860, l. col. 1080. He also mentions the other two dramas: "Pauli Bekehrung," Basel, 1546; "Oelung Davidis," Basel, 1554; and quotes the prices (a few francs only!) which they fetched at different sales.

¹⁰ This reprint of the 1551 edition is contained in *Schweizerische Schauspiele des Sechszehnten Jahrhunderts, bearbeitet . . . unter Leitung von Jakob Bächtold*, Zurich, 1891, vol. ii. pp. 113-153. The text of the play is preceded, pp. 99-112, by an introduction about Boltz's life and writings by the editor, Dr. Albert Gessler. He merely refers to the *Illuminirbuch* by name, but says nothing about it.

¹¹ There is a copy of this book in the British Museum (11745, bbb. 7). The title is as follows:—

Oelung Dau | dis dess Jünglings, Vnnd | sein
streit wider den Ri- | sen Goliath. | Durch
Valentinum Boltz | von Ruffach. | [vignette]
Gedruckt zu Basel by Bartholome | Stähelin.
1551. |

It is a small 8vo, a to l in eights, in three leaves, the fourth (blank? or with a device or colophon?) wanting, and is neatly printed in various sizes of type, with head and tail pieces. The vignette is a tented field, with David and with Goliath in his panoply in the foreground. On b7 *verso* is a woodcut of Samuel pouring oil on David's head.

If the other plays are got up in the same style, the three would form a choice morsel for the book lover.

Other plays are mentioned as having been written by Boltz, but they do not seem to have been printed.

13. Besides the plays, a translation in verse is attributed to him by Graesse,¹² which I have not observed quoted by any other authority:—

Senece gsprächbüchlein wider die unversehene
zufäl (*En vers rimés.*) Basel, Jac. Kündig,
1552, in 8°. Av. fig. en bois. (3th. Heyse.)

Boltz's death is said to have occurred in 1560, at Bingen in Baden.

14. Into the merit of these plays it is not the business of the present paper to inquire. They have been reviewed¹³ and their importance appraised as illustrative of the then mode of thought, the manners and customs, and the morals, or want of them, which the preachers of the period fulminated against. But it is as well to know that our author was more prominent in dramatic and other literary pursuits, than in the obscure art of illumination.

15. In the midst of all his preaching and play-writing and acting, one rather wonders how he found time to acquire the knowledge and skill which his book about colours and illumination shows he possessed, or to practise the art as he must have done. But, however it is to be accounted for, the book was certainly written and published by him, for it is referred to by his biographers. The subject, however, seems so incongruous with his other occupations, that it is not surprising that the plays and the book on colours have been assigned to different authors.

16. Whether the date of the first edition be 1517 or 1549, does not affect the value of the book as being the first of a contemporary series which traverses nearly the same ground as that done by the *Kunstbüchlin*, but, with certain exceptions, furnishes a different set of receipts, besides treating of a subject not alluded to in any of the other books. On the other hand a large portion of its contents has been transferred to the *Secret-Bock* of Carolus Battus, to be mentioned subsequently, where it accompanies receipts contained in books already analysed. Indeed

¹² *Trésor de Livres Rares et Précieux*, Dresde, 1859, I. 478.

¹³ By Gessler already quoted, and by Jacob Bächtold, *Geschichte der Deutschen Literatur in der Schweiz*, Frauenfeld, 1892, pp. 341-347.

without some notice of Boltz's work, and of Helmreich's as well, the account of Battus's collection would be inadequate.

17. To come, therefore, to the *Illuminirbuch*, the work of Boltz which is our chief concern, I have here a copy of a late reprint and have examined those in the British Museum. But if one can trust the bibliographers, there are others besides these, and the first edition was printed at an early date. They may be enumerated.

18. 1547. The following notice is given by Christophorus Hendreich:—¹⁴

BOLTZIUS Valentinus Rubeaquensis. De coloribus eorumque preparatione, Mixturis. Item nonnulla secreta picturæ & aliarum artium. Basil. 1547.

As the other editions which he enumerates are preceded by the word "Germanice," one is almost justified in assuming that this edition was in Latin. No other of earlier date is recorded, so that it may be considered the first, until one before it is found. Only Hendreich refers to this edition, but he gives no description of it.

19. 1549. Farbbüch oder Illuminirbuch durch Valētīnū Boltz. MDXLIX. *Getruckt zu Basel, off dem Nüwen Platz, by Jacob Kündig*, in-12, de 372 pp., 118 fig. s. bois.

This is the title as given by Brunet.¹⁵ He adds this note:—

"An interesting book for the history of the art of miniature; it describes the composition of all the colours employed at the beginning of the XVth century; M. Didot is of opinion that the title-page of the Register is a composition of Holbein's."

There can be hardly a doubt about this edition. It was printed by Kündig, who also printed "*Der Weltspiegel*." A point of importance, however, is the number of woodcuts it contains, for in that respect it differs from all the later editions I have examined. Moreover it appears to be considerably larger, because the 1630 edition, for example, contains only 131 pages, with 7 of index. Whether this difference be due merely to the

¹⁴ *Pand. de Brandenburgica*, Berolini, 1699, p. 634.

¹⁵ *Manuel du Libraire*, Supplément, Paris, 1878, I. col. 149. Brunet unfortunately does not say where he saw this copy.

style of printing, or perhaps to the illustrations, or to an actual curtailment of the matter in later editions, I am unable to say, as I have not seen this book. Nor is there any account of the ornamented title-page ascribed to Holbein.

20. It is from these entries one infers that the book was published first in Latin in 1547, as Hendreich implies, and that it was almost immediately turned into German and published in 1549.

On these points there is uncertainty from want of copies, but whether or not there was a Latin edition to begin with, there was none afterwards, so far as I know. It seems quite certain, however, that there was a German version in 1549. Brunet could not well have invented the title he gives: he must have taken it from a copy, for it is obviously genuine.

21. The edition of 1549 is quoted also by Graesse,¹⁶ as follows:

Neu herfürgesuchtes Illuminirbuch künstlich
alle Farben zu machen und bereiten etc.
Basel, Jac. Kündig 1549, in 8. Av. fig. en bois.
(1½th. R. Weigel.)

This title diverges so widely from Brunet's as to engender doubts. When the following list is examined it will be seen that Brunet's form of the title with the word "Farbbuch" does not occur again, while Graesse's form does not appear till 1645 and 1661. Of the editions which I have not seen I can, of course, say nothing, but, the edition of 1550, presumably, will either resemble its predecessor of 1549 and contain the word "Farbbuch," or it will have dropped it and introduced the form which is found in the edition of 1566, and its successors. As to that of 1579, it will probably be the same as that of 1566 or 1589.

The following questions, therefore, remain unanswered, for want of data:—

1 Is the title, as given by Brunet, complete, or has it been curtailed, or is it merely descriptive?

2 Is Graesse's version of the title complete, and, if so, what has become of the word "Farbbuch?"

3 If Graesse's be the full title, why was it altered subsequently by the omission of the introductory words?

¹⁶ *Trésor de Livres Rares et Précieux*, Dresde, 1859, I. p. 478.

4 Why was Graesse's version returned to after the lapse of a hundred years?

5 Is it possible that the book was issued in 1549 with two quite different title-pages?

22. All these difficulties might disappear if one could lay hands on a copy of Kündig's edition and on those of 1550 and 1579 as well.

In their absence, however, I am inclined to regard the title given by Brunet, if not complete, as more nearly genuine than Graesse's. In the latter case it is difficult to reconcile the late form with the first publisher, or to believe that Graesse had a copy of the book before him and did not transfer the entry from Weigel's second-hand book-catalogue, price and all. If so the burden of the anomaly falls upon the dealer, and not upon the Dresden Royal librarian, but it is remarkable that on this occasion Graesse should have passed Brunet by, from whom he has taken so much for his own book at other times.

This edition is not included in Hendreich's list. It is referred to in passing by recent writers on Boltz, but without detail, and without displaying any first-hand knowledge, so presumably it was not examined. The biographers, moreover, seem to attach no importance to this aspect of Boltz's activities, for they have said nothing about it, thereby displaying their own want of knowledge and appreciation. The fact of its being foreign to his other work should have emphasized its individuality and significance. But then they knew nothing about the subject.¹⁷

23. 1550. After the entry of the 1547 edition quoted above Hendreich adds: "Germanice, F. a. M. 1550." Apparently he did not know the Basel edition of 1549, and the word "Germanice," as has been already pointed out, seems to imply that the 1547 edition was in Latin. I have not seen a copy or any other notice of a 1550 edition.

Could there have been so brisk a demand for the book as to necessitate such a rapid output? It is possible, and the consumpt may account for the scarcity of all three editions. The run upon them, however, seems to have stopped as quickly as it arose, for

¹⁷ Perhaps Scherer may be excepted. He says: "Besides the drama and preaching Boltz understood the technique of painting. His *Illuminirbuch*, 1549, teaches the preparation of colours." *Allgemeine Deutsche Biographie*, Leipzig, 1876. III. 114: but he may have copied that from Graesse.

there is no indication of Boltz having brought out an edition between 1550 and 1560, the reputed year of his death. In fact the next edition I have met with did not appear till six years later.

24. 1566. The following account is taken from the copy which is in the British Museum [1042. c. 41. (1.)] and is the earliest edition I have seen.

I [Illuminir-
buch, Künstlich]

alle Farben zumachen vnnnd bereyten,
Allen Schreibern, [Brieffmalern], vnd
andern solcher Künsten liebhabern, gantz lü-
stig vnd fruchtbar zuwissen, [Sampt etli-
chen newen zugesetzten Kunststücklin,]

vormals im Truck nie
aussgangen.

[Durch Valentinum Boltzen
von Rufach.]

[15] [Vignette] [66]

[Den Imhalt dises Büchlins, sampt dem
Register findestu am ende, &c.]

Small 8°. A to H in eights, 1 four leaves; or, ff. [2] 60
[6, Register]. Title red and black; the red parts are within
heavy brackets. The vignette is a representation of the tools
used in illuminating. On the recto of the last leaf, liij., after
the index, is the colophon:—

Gedruckt vnnnd vollendet
Im Jar nach der Geburt
Christi
1566.

There is neither place nor printer's name, but from the florid
capitals employed it may have emanated from Egenolff's press.
The type is smaller than usual, but, from its neatness and the
clear spacing, it is much more legible than the ordinary con-
temporary printing. Altogether it is a rather elegant little book,
far superior to the later issues. The printed page measures
4 $\frac{8}{16}$ inches.

This copy agrees with the others of later date which I have had for comparison, but, as already remarked, it is difficult to reconcile its size, pp. 132, with the 372 pp. of that of 1549. The 118 woodcuts of the latter also present a difficulty, for in none of the editions I have collated are there any woodcuts, and, truth to tell, one does not very well see what they could be used to illustrate.

The 1566 edition is included by Graesse, but by no other authority I have consulted.

25. 1571. An edition of this year, in 8^o at Frankfurt, is mentioned by Graesse, but by no one else.

26. 1589. The edition of this year is one of those known to Hendreich. There is a copy in the British Museum [1043. b. 41. (2.)] of which the following description may be given.

[I l l u m i n i r b u c h

K ü n s t l i c h a l l e F a r b e n z u m a -
c h e n v n n d b e r e y t e n , A l l e n S c h r e i -
b e r n , [B r i e f f m a l e r n ,] v n n d a n d e r n s o l e h e r
K ü n s t e n l i e b h a b e r n , g a n t z l ü s t i g v n d f r u e c h t b a r

z u w i s s e n , [S a m p t e t l i c h e n n e u e n z u g e -
s e z t e n K u n s t s t ü c k l i n ,] v o r m a l s

i m T r u c k n i e a u s s -
g a n g e n .

[D u r c h V a l e n t i n u m B o l t z e n]
v o n R u f a c h .

[V i g n e t t e .]

[D e n I n n h a l t d i e s e s B ü c h l i n s , s a m p t d e m]

R e g i s t e r f i n d e s t u a m E n d e , & c .

1 5 8 9 .

Small 8vo. A to H in eights, Hvij is blank; or, ff. [2] 55 [6, Register and colophon] [1 blank]. Title red and black; the red parts are put within heavy brackets. The vignette is identical with that in the 1566 edition, but the book itself is not nearly so neat and attractive.

The colophon is on Hvij recto, as follows :—

Getruckt zu Franckfort
am Mayn, bey Martin Lechlern,
In verlegung Barbara, weilandt Doct.
Johannis Cuipij, vnnnd Maria, weilandt Pau-
li Steinmeyers, beyder nachgelassen Witt-
ben, als Christian Egenolffs seligen
Erben, Im Jar nach der
Geburt Christi, vn
sers Erlö-
sers.

[Device]

M. D. LXXXIX.

The device is Egenolff's : an altar with fire burning on it.

The printed page measures $4\frac{7}{16}$ inches.

27. The 1613 edition is also in the British Museum (787. e. 2. [2.]), and is as follows :

[Illuminirbuch,]
Darin begriffen,

W[ie man al-
le Farben machen]

vnd bereyten soll: Allen Schreibern,
Brieffinahlern, vnd andern solcher Künsten Lieb-
habern, gantz lustig vnd nutzbar
zuwissen.

[Sampt etlichen newen zugesetzten Kunststück-]
lein vormals in Truck nie aussgangen,

Durch

[Valentinum Boltzen von Rufach.]

[Vignette.]

[Den Inhalt dieses Büchleins, sampt dem]
Register findestu am Ende, &c.

[Franckfurt bey Vincentio Steinn. 1613.]

Small 8vo. A to F in eights, G four leaves ; or, pp. 98 [6, Register].
Title red and black ; the red portions are those within heavy
brackets. The vignette is the same as that in the 1566 edition.

There is a colophon on Giiij *verso*, after the "Register" :—

Gedruckt zu Darmbstatt, bey Bal-
thasar Hofmann, in Verlegung Vincentij
Steinmeyers, im Jahr 1613.

The printed page, exclusive of the head-line and the catchword line, measures $4\frac{1\frac{3}{4}}{16}$ inches.

This edition is given by Hendreich, both under the title: "Illuminir-Büchlein," and the Latin title: "De coloribus eorumque preparatione, . . ." Whether he thought these were two separate works or not, I am unable to say. The 1613 edition is not mentioned anywhere else.

28. 1630. The next edition is not in the British Museum, and is not referred to in any of the notices or lists.

[I l l u m i n i r b u c h ,
K ü n s t l i c h a l l e F a r b e n z u
m a c h e n v n d b e r e y t e n , A l l e n S c h r e i -
b e r n , B r i e f f m a l e r n , v n d a n d e r n s o l c h e r K ü n -
s t e n l i e h h a b e r n , g a n t z l u s t i g v n d f r u c h t b a r z u
w i s s e n , S a m p t e t t l i c h e n n e w e n z u g e s e t z t e n K u n s t s t ü c k -
l e i n , v o r m a l s i m T r u c k n i e a u s g a n g e n .

Durch

[V a l e n t i n u m B o l t z e n v o n]

Rufach,

[Den Inhalt dieses Büchleins, sampt dem]

Register findestu am Ende, &c.

[Vignette.]

[Gedruckt zu Strassburg, hey Marx]

von der Heyden am Kornmarkt, 1630.

Small 8vo. A to I in eights; or, pp. [1] [1-2] 3- (mis-printed 2) 131 [9 Register (Contents)]. Title red and black, the red parts are within heavy brackets. The vignette represents the top of two tables, on which are lying the pencils, pots, sancers, etc., used in illuminating.

29. 1645.

Neu herfür gesuchtes
Illuminirbuch,
Künstlich alle Farben zu ma-
chen vnd bereiten, Allen Schreibern.
Brieffmahlern, vnd andern solcher Künsten
Liebhabern, gantz lustig vnd fruchtbar zu wissen.
Sampt etlichen newen zugesetzten Kunststücklein,
vormals im Truck nie aussgangen.
Durch
Valentinum Boltzen von Rufach.
[Vignette.]

Den Inhalt dieses Büchleins, sampt dem
Register findestu am Ende, &c.
Hamburg, bey Heinrich Wernern.
Gedruckt Im Jahr 1645.

Small 8vo. A to H in eights; or, pp. [4] 114 [10 Register]. The vignette is a coarse copy of that in the 1566 edition. The printed page, exclusive of the headline and rule, and catchword line, is $4\frac{1}{8}$ inches. Some are 5 inches. This edition may be compared with that of 1661. It is this version of the title which is given by Graesse as that of the edition of 1549.

The copy described is in the British Museum, 1043. b. 41. (3.).

30. With regard to the following Danish translation, it is a coincidence that it should prove to be immediately connected with the two Danish tracts already referred to in the first supplement so long ago as 1894, at which time I had no inkling of a third part. The connection may be thus demonstrated.

The first tract is entitled:

Oeconomia eller nødvendig Beretning oc Anledning,
hvorfledis en gandske Huuszholding paa det nytteligste
oc beste . . . Kand anstillis.

It is a translation from the German, of a book by Caspar Jügel on Household Management, but it has nothing to do with the subject under consideration. It is in 4, signatures A to E in fours, F 2 leaves, or pp. 41 [2, table of contents, 1 blank].

In the British Museum copy this is followed by the Danish translation of the tract on inks and colours, etc., ascribed to

Alexis. It has a separate title-page, pagination and index, but the signatures are taken up from those above and run on from G to O in fours, P 2 leaves, or pp. 64 [4].

The first tract was mentioned incidentally, but the second was described and analysed in the first supplement (§§11-12).¹⁸ Subsequently I obtained a separate copy of this tract and from it was taken the facsimile of the title-page which was appended to the fourth supplement.¹⁹ The British Museum copy of the third tract, being the translation of Boltz's book, is bound apart from the other two in a different volume, and there is nothing in the Museum Catalogue to indicate that it is a portion of a volume, though that is clear from the signatures, as well as from the printer, the date, and the typography of it.

The curious thing about this volume is that the parts seem to have been sold each by itself or collectively as was desired. Since the parts are complete in themselves no one would suppose they had connection with any other, except for the running on of the signatures in parts II. and III. I have not seen a separate copy of the first part, but no doubt it may be met with.

31. 1648. The following is the title from the Museum copy, 1044, d. 9. (1.).²⁰

En Ny oc Konstrig
I l l u m i n e r - B o g

Det er:

Hvorledis konsteligen er at giøre oc
berede alleslags Farfiver, som er meget lystig
oc gaffnlig at vide for Skriffvere, Malere oc
andre som elske saadan Konst, sampt nog-
le nye tilsatte Konst-stykker, som til-
forne aldrig ere udgangne
paa Prent.

Ved

Valentinum Bolt en aff Rufach.

Oc nu paa Danske udsat, oc til Trye
eken forfordiget.

Tryckt i Kiøbenhavn, Aar 1648.

Aff Peter Hake.

Paa Jørgen Holstis Bogf. Bekostning oc
findis hos hamem tilkiøbs.

¹⁸ *Proceedings*, 1893-94, xxv., p. 232.

¹⁹ *Proceedings*, 1912-13, xlv., plate viii.

²⁰ The accompanying fac-simile exhibits the appearance of the title-page. It should be compared with that of the second tract in Supplement IV., referred to in note 19, above.

En Ny og Konstlig

Illuminer = Bog

Det er:

Hvorledis konsteligen er at giøre og
berede alle slags Farffver / som er meget lystig
og gaffnlig at vide for Skriffvere / Malere og
andre som elske saadan Konst / sampt nog-
le nyetilsatte Konst-stykker / som til-
forne aldrig ere udgangne
paa Prent.

Med

Valentinum Volken aff Kusach.

De nu paa Danske udsat / og til Tryk-
ken forfærdiget.

Tryckt i Kiøbenhavn / Aar 1648.

Aff Peter Hake.

Paa Jørgen Holstis Bogs. Bekostning og
findis hos hennem tilkøbs.

Small 4. Q to Z, Aa to Dd in fours, Ee two leaves; or pp. 106 [4, alphabetical table of contents]. Black letter.

A few receipts have been omitted, and one or two paragraphs added, but the book otherwise is a complete translation.

32. 1661. The next edition is in the Museum [786, a. 47. (3.)].

Neu herfür gesuchtes
Illuminirbuch,
Künstlich alle Farben zuma-
chen und bereiten, allen Schreibern,
Briefmahlern, und andern solcher Künsten Lieb-
habern gantz lustig und fruchtbar zu wissen, sampt
etlichen neuen zugesetzten Künstücklein, vor-
mahls im Druck nie außgangen.
Durch
Valentinum Boltzen von Rufach.

[Vignette.]

Den Inhalt dieses Büchleins, sampt dem
Register findestu am Ende, etc.
Erfurdt, bey Martha Hertzin,
Gedruckt im Jahr 1661.

Small 8vo. A to H in eights; or, pp. [4] 114 [10 Register]. The British Museum copy wants Hviij., the last leaf of the index. The vignette is again a rude copy of that of 1566, and it is from a different block from that in the 1645 edition. See that date.

The printed page measures $4\frac{1}{16}$ inches, but seems to vary by a $\frac{1}{16}$ th.

33. 1669. Graesse reports an edition of this date in 12mo, with the price: 1 fl. 12 kr. Scheible. This confirms the edition if the date be correct. I have not met with it, or with another reference to it.

34. 1675. An edition of this date, in 8vo, printed at Augsburg (Augusta Vindelicorum) is mentioned by Hendreich. This edition also is unknown to me.

35. If the foregoing editions all exist, there are thirteen of them between 1547 and 1675, say 130 years, or an edition every ten years on an average. Books of receipts for every-day, or

popular use, generally reached a new edition every four or five years, while they lasted. Illumination, however, was not an every-day subject, and Boltz's book, therefore, may be regarded as exceptional by its continuance and by the number of editions. Though an existing edition or two, perhaps between 1589-1613-1630, may have escaped the bibliographers, the list now compiled, all things considered, is probably nearly complete.

36. In his preface to the reader, Boltz defends his little manual against artists who might blame him for taking the bread out of their mouths, by revealing the secrets of the art and thus making them common. He replies that he had no such intention, but rather to please those who had skill in the art, and with their assistance to improve it. There might also be worthy people who amused themselves with plants and other objects, and so he desires artists not to be annoyed at his simple directions, but rather to help their neighbour to extend the work which would not diminish but increase their praise and their profit. For we are made, he says, to serve God and His creatures, not to bury our pound and gift, but to use them to the honour of God, our neighbour and ourselves. And he asks that where he has failed or left anything imperfect it may be amended, for no one on earth but has his shortcomings. "God grant us all the spirit of His perfection."

So he concludes, and as Boltz flourished some three hundred and sixty years ago, he may get credit for his aspirations being perhaps genuine. They remind one a little of his preface to Terence, and in that way confirm the authorship of this tract.

37. The book is in three main divisions: 1° mediums, varnishes and colours; 2° use of the colours in painting; 3° receipts for inks, etching, dyeing horn, bone and feathers, lutes, and so on.

38. In the first division minute directions are given for preparing mediums. They consisted of gum arabic, tragacanth, parchment glue for colours which do not go well with gum arabic; cherry tree gum, almond gum, and some others. The preparations are accompanied with hints and cautions which only one familiar with the methods and uses could supply. Besides the various gums, alum, vinegar, white of egg, myrrh, mastic, linseed oil for varnishes, were employed. Full directions are given for a ground for laying gold upon, everything depending on the quality of the medium for success. Here Boltz's practical experience is in evidence. But one advice he gives

which is to see that in making the gold ground the sky is free from clouds, just like Brazil colour, which must also have a bright sky; "this experience has taught me," he adds.²¹

Various ways of preparing mosaic gold, as it was called, are given, but they all turn on the use of tin, mercury, or tin-amalgam and sulphur, with salammoniac. The details are full and precise, and the vessels required are described. One or two of the methods appear in certain of the earlier receipt books. Another material employed was hæmatite, an ochreous earth, the best coming from Africa and Arabia, and apparently much the same as ruddle.

39. With this begins the second part of the first division relating to colours.

Among the reds the first is artificial cinnabar, made by heating together mercury and sulphur. The receipt is the same as that given in the previous series. Boltz, however, adds the medium, white of egg prepared as detailed in the first part. Another red colour was made from Brazil-wood by boiling it with lye, straining and adding powdered alum. Modifications yielded different tints, but the essential constituents were alum and the Brazil-wood colouring-matter. Other red colours were lac, dragon's blood, sarcocolla, and red lead.

A brown colour was obtained from Brazil-wood and white vitriol. Liver colour was got from mixing ruddle with the black or grey residue of calcined tartar.

Fire colour was a mixture of orpiment, a little cinnabar or massicot and red lead. Another was aurum musicum and red lead.

Several yellow colours were known. What was called rauschgelb, seems to have been a mixture of realgar and saffron. Boltz warns the artist not to let it into the mouth, and not to temper it with gum arabic.

"Orpiment is a dangerous but beautiful colour. When grinding it see that your mouth and nostrils are covered to stop the dust and fume. Temper it with parchment glue, or gum water, and see that you don't lick the hair pencil with this colour on it, for it is hurtful;" so that is an old trick of artists! Massicot is one of the yellow colours, but there is no hint as to

²¹ Compare "A Booke of Secrets." B₂ *recto*, reprinted in Supplement IV. *Proceedings*, 1912-13, vol. xlv. See also §56, below.

its formation, only its purification, for use with parchment glue. Buckthorn berries give a yellow colour with alum, and another was the *flos tinctorius* (or dutch pink) used by dyers. The flowers were boiled with lime, the liquor strained and treated with finely powdered alum and chalk, but care was to be taken that it did not fly up when the chalk and alum were mixed. Saffron tempered with white of egg medium, orpiment ground with goat's or bulloch's gall and saffron added, and ochre were employed.

Green colours were of both mineral and vegetable origin. Verdigris was made by the action of vinegar on copper. Greek green, as it was called, or Spanish green, was made much in the same way. Sap green, from hawthorn berries with alum, was a lake, like most of these vegetable colours.

The blue colours were azure, smalt, ultramarine, litmus, woad, indigo, the juice of dane wort berries, and some others. Considerable attention is given to these.

The mode of preparing a purple colour from bilberries is stated in terms identical with those in the *Kunstbüchlin* of 1537. Compare "A Booke of Secrets" in Supplement IV. B₂ verso.

Among other colours is one derived from wood soot by boiling with a sharp lye and straining. It was used for shading. Black was a fine charcoal made from peach stones by heating them out of contact with the air. White colours consisted of white lead, made from lead by hanging it in a vessel with strong vinegar in a warm place "for three or five weeks." As the vessel was closely covered the product could hardly be the basic carbonate. Chalk and eggshells and powdered glass were also employed. A grey colour was obtained from these by adding a little indigo and black as was requisite. A dun colour was made by mixing ochre and soot colour.

40. The second division of the tract contains directions for using the colours and mediums in the actual work of painting and shading. It appeals specially to the artist and illuminator as being of importance to him in his choice of colours and their combinations, but as it does not involve any chemical process or action, it lies outside the scope of these notes. It reveals, however, the pleasure which the author had in the art, and his enthusiasm over the beauty of the results.

11. The third division is rather miscellaneous. There is a

way to render parchment coloured and transparent, to make black ink, and oiled tracing paper. Boltz gives directions how to construct a hair pencil, a job which the modern artist would hardly undertake. He says, "It is a common saying that good tools do half the work. So with painting: good brushes make merry painters, but bad brushes breed many a bungler," and he tells how to set about making good ones.

42. Etching both in relief and incised is described. In the former case the design was made on a plate of iron or steel, with a mixture of massicot and linseed oil, and when it was dry and firm, a liquid consisting of verdigris, plumose alum, salammoniac, tartar, green vitriol, common salt, all in strong vinegar, was poured on the plate till sufficiently corroded. As a glimpse of empirical chemistry it is instructive. The sunk etching was done in the usual way by coating with wax, drawing the design with a sharp point and corroding the metal with a mixture of verdigris, corrosive sublimate, green vitriol and alum in strong vinegar. Feathers and bone were coloured red by boiling in Brazil wood; green in verdigris and salammoniac; yellow in barberries, and blue in bilberry juice; but all feathers, bone, hair and wood must be previously "mordanted"²² with alum.

Various methods and mixtures are given for "lutum sapientiae," but the main constituents are fire clay and horse dung, or iron filings quicklime, white of egg, in different combinations. Another was potter's clay with cow hair or flocks, or horse dung. These were used for covering glass vessels exposed to high temperatures or for closing vessels.

Cinnabar was tested by heating on an iron plate. If it gave off a yellow vapour it was considered genuine. Then it was ground with pure red wine, saffron added, and the whole tempered with albumen and gum water. Albumen is his name for white of egg.

Cinnabar, however, was adulterated with red lead for cheapness. It could not be detected by the colour. It was used for rubricating and was applied by a special medium. A whole egg was mixed with vinegar. It was well broken and squeezed half-a-dozen times through a sponge, and so used.

Those who wrote with this "bastard cinnabar" did not know that time would discover the adulteration. A reaction takes

²² "eingebeyzt"; it is Boltz's own expression.

place, and instead of the red colour remaining bright it becomes covered with a grey shining film of lead sulphide. It can be seen in old books.

The preparation of azure, the sizing of porous paper, so that it may take colours without running, and the softening of iron, copper, and other metals for engraving, conclude the volume.

43. Of the contents of this manual the second division about painting does not appear in any of the books enumerated in the previous parts of this research. A good number, however, of the colour receipts and a few others do occur, but I have not attempted to refer to these individually.

The comparison will be better made in a tabular form when the various books which contain them are arranged by date.

Whether the verbal differences and the fuller or more curtailed directions point to editorial divergences from a primitive source anterior to 1531, is a matter on which I can express no opinion, for I have never come across it, and, indeed, the origin of all the receipts is unknown. When Boltz states the result of his own experience, which he does more than once, we may accept that as a portion at least of his contribution to the art.

The book remains a credit to him, and its shortcomings are those of the limited knowledge of the time and not of Boltz personally.

II. ANDREAS HELMREICH.

44. Andreas Helmreich, or Helmrich, calls himself of Eissfeldt, which is a small town twelve or fourteen miles to the north of Coburg. Little seems to be known about him beyond what he himself has recorded. He was born in the first half of the sixteenth century, and he became an accountant, arithmetician, ganger and measurer, notary public, and clerk or registrar, at Halle, in Saxony.

He says himself that in consequence of his profession his attention was drawn to the manufacture of ink, and to etching on metals, on which subjects he published in 1567 the small volume referred to below.

Twenty years later, in 1588, he published at Leipzig his *Rechenbuch* in small 4°, pp. [14, 2 blank], 317 [3, 2 blank]. A new and much enlarged edition came out at Leipzig in 1595, 4°, pp. [15, 1 blank] 627 [2, 2 blank]. This treatise deals with the measurement of solids, etc., and with account keeping.

45. The work by him, however, that calls for notice here is the

pamphlet aforesaid, of which I have seen copies of five editions. These do not exhaust all that were published, for there was certainly one earlier than any I have met with, and it is possible that there were others. They may be described.

46. 1567. The earliest edition of which there is any mention is dated 1567, and is quoted by Zedler.²³ The title as he gives it is as follows :—

Kunst-Büchlein, wie man aus Marmelstein, Kupffer, Messing, Stahl, Eisen, Harnisch und Wafften, etzen und künstlich vergolden soll.

This, as will be observed, is only the first part of the title, but it evidently denotes the same book as those which follow, and it is probably the first edition. Zedler calls it thorough and valuable.

47. The following are the editions I have seen :—

Kunstbüchlin.

[W i e m a n a u f f
M a r m e l s t e i n, K u p f f e r, M e s -
s i n g, Z i h n, S t a l, E i s e n, H a r -
n i s c h v n d W a f f e n e t c. E t z e n v n d
k u n s t l i c h v e r g u l d e n s o l.

Mit vorgehendem Bericht:

[W i e m a n D i n t e n, P r e -
s i l g e n, v n d a l l e M e t a l f a r b e n z u m]
S c h r e i b e n, M a n c h e r e y (*sic*) F a r b e n, P a r g e -
m e n t v n d F e d e r n z u f e r b e n. A l l e M e t a l l e n a u s
d e r F e d e r n z u s c h r e i b e n, G o l t v n d S i l b e r F u n -
d a m e n t l e i n, v n d G o l t w a s s e r a u f f a l l e r l e y

B a l l e r e y, v n d d e r g l e i c h e n m e h r, m a -
c h e n v n d T e m p e r i r e n s o l.

[Z u d i e n s t v n d E h r e n a l l e n
S c h r e i b e r n, A u c h d e n v n e r f a r n e n d e r]
E t z k u n s t, z u s a m e n b r a c h t

D u o c h

[A n d r e a m H e l m r e i c h, R e c h e n
m e i s t e r z u H a l l.]

V o n n e w e m v b e r s e h e n, g e m e c h -
r e t v n d g e b e s s e r t.

[1 5 7 4 .]

²³ *Grosses Universal Lexicon*, Halle u. Leipzig, 735, vii., col. 1308.

Small 8vo. A to E in eights. No pagination. Title red and black, the red portions are indicated in this and the other transcriptions by being enclosed in heavy brackets. There is no table of contents or index. On Evijj. *recto* is the colophon:—

Gedruckt zu Witteberg,

Durch Lorenz

Schwenck.

1 5 7 4 .

The verso is blank.

This edition is not in the British Museum.

The book is dedicated to the Honourable and Prudent “Ern Busso Sandaw,” burgher and councillor at Halle, and the dedication is dated 1567, so presumably it has been reprinted from the edition of that date. Apparently it was the habit of the Halloren and the Hallunken to drop their h’s.

48. 1590. This edition is in the British Museum, 725. a. 15. (2.).

Kunstbüchlein

[W i e m a n a u f f
M a r m e l s t e i n , K u p f f e r , M e s -]
s i n g , Z i h n , S t a h l , E y s e n , H a r -
n i s c h v n d W a f f e n , e t c . E t z e n , v n d
k ü n s t l i c h v e r g ü l d e n s o l .

Mit vorgehendem Bericht:

[W i e m a n D i n t e n , D i n t e n -
p u l v e r , P r e s i l g e n , v n d a l l e M e t a l l f a r b e n]
z u m s c h r e i b e n . M a n c h e r l e y F a r b e n , P e r g a m e n t v n d
F e d e r n z u f e r b e n . A l l e M e t a l l e n a u s d e n F e d e r n z u
s c h r e i b e n . G o l d v n d S i l b e r F u n d a m e n t l e i n , v n d
G o l d w a s s e r a u f f a l l e r l e y B a l l e r e y , v n d d e r g l e i -
c h e n m e h r , m a c h e n v n d t e m p e r i r e n s o l .

[Z u d i e n s t v n d E h r e n a l l e n S c h r e i -]
b e r n , a u c h d e n v n e r f a h r e n d e r
E t z k u n s t , z u s a m m e n b r a c h t

Durch

[A n d r e a m H e l m r e i c h , R e c h e n -]
m e i s t e r z u H a l l ,

V o n n e w e m v b e r s e h e n , g e m e h -
r e t v n d g e b e s s e r t .

Small 8vo. A to E in eights. No pagination. Title red and black. The book contains neither table of contents nor alphabetical index.

On Evij. *recto* is the colophon:—

Gedruckt zu Leipzig, bey
Johan: Beyer.
Im Jahr:
M. D. XC.

This is a reprint of the 1574 edition, but it contains half-a-dozen additional paragraphs, which appear in subsequent editions also.

The dedication, as in the 1574 edition, is to the author's good friend, "Ern Busso Sandaw," and is dated 1567.

49. 1601. This also is in the British Museum, 1036. a. 10.

Kunstbüchlein.

[W i e m a n D i n -
ten, Dintenpuluer, Presil-
gen, vñnd alle Metallfarben zum
schreiben: Mancherley Farben. Parga-
ment vñ Federn zu fernen: Alle Metallen aus
der feder zu schreiben: Gold vñ Silber Funda-
mentlein, vñd Goldwaseer auff allerley
Ballerey, vñd dergleichen mehr,
machen vñd temperie-
ren sol.

[J t e m, W i e m a n a u f f M a r -
melstein, Kupffer, Messing, Zihñ,]
Stahl, Eisen, Harnisch vñd Waffnen, &c.
etzen, vñd kunstlich vergülden sol.

Zu dienst vñd Ehren

[Allen Schreibern, Schülern, vñd]
der Etzkunst vñerfahrenen, zusañen ge-
bracht, vñd auffß new gemehret
Durch

[Andream Helmreich, Rechen-]
meister zu Halle.

[Scroll ornament.]

[Gedruckt zu Stettin, Anno 1601.]

Small Svo. A to E in eights. No pagination. Title red and black. There is no table of contents or index.

On Evij. verso, immediately after the text, but separated by a typographical ornament, is the colophon:—

Gedruckt zu Alten Stettin,
durch Joehim Rheten.
Im Jahre
M. D. C. I.

followed by a small ornament.

Evij., probably blank, is wanting in the B.M. copy, as well as sheet D.

It will be noticed that the title in this edition is arranged in an order different from that in the others. The dedication also is called "Preface to the Reader," and to suit this change the introductory and concluding sentences are modified, though the body of the address remains the same. The date, 1567, is not altered.

50. The following edition, undated, but early in the 17th century, is not in the British Museum.

Kunstbüchlein,

[W i e m a n a u f f
Marmelstein, Kupffer, Messing,]
Zihn, Stahl, Eisen, Harnisch und
Waffen, &c., etzen, vnd künstlich
vergülden sol.

Mit vorgehendem Bericht:

[Wie man Dinten, Dintenpulver,
Presilgen, vnd alle Metallfarben, zum]
schreiben mancherley Farben, Pergament vnd
Federen zu färben: Alle Metallen aus der Feder
zu schreiben: Gold vnd Silber Fundament-
lein, vnd Goldwasser auff mancherley
Ballerey, vnd dergleichen mehr,
machen vnd tempe-
rirn sol.

[Zu Dienst vnd Ehren allen Schrei-]
bern, auch den Vuerfahren aller Etz-
kunst, zusammen bracht,
Durch

[Andream Helmreich, Rechen-]
meister zu Halle,
von newen vbersehen, gemehret
vnd gebessert.

[Leipzig, bey Nicol. vnd Christoph. Nerlich.]

Small 8vo. A to E in eights, Evij. blank. No pagination. Title red and black. No date. There is no table of contents or index. The receipts added to the 1590 edition are reprinted here.

The address, dated 1567, is now directed to "Herr Busso Sandaw."

51. The next edition is in the British Museum, 1044. a. 11. (1.).

Kunstbuchlein

[W i e m a n n a u f f
M a r m e l s t e i n , K u p f f e r , M e s -]
s i n g , Z i h n , S t a h l , E y s e n , H a r n i s c h
v n d W a f f e n , e t c . e t z e n v n d k u n s t l i c h
v e r g ü l d e n s o l .

Mit vorgehendem Bericht :

[W i e m a n D i n t e n , D i n t e n
p u l u e r , P r e s i l g e n , v n d a l l e M e t a l l -]
f a r b e n z u m s c h r e i b e n , M a n c h e r l e y f a r -
b e n , P e r g a m e n t v n d F e d e r n z u f e r b e n . A l l e M e -
t a l l e n a u s d e r F e d e r n z u s c h r e i b e n . G o l d v n d
S i l b e r F u n d a m e n t l e i n , v n d G o l t w a s s e r
a u f f a l l e r l e y B a l l e r e y , v n d d e r g l e i c h e n
m e h r . m a c h e n v n d t e m p e r i -
r e n s o l .

[Z u D i e n s t v n d E h r e n a l l e n S c h r e i -]
b e r n , a u c h d e n v n e r f a h r e n d e r E t z -
k u n s t , z u s a m m e n b r a c h t -
D u r c h

[A n d r e a m H e l m r e i c h , R e c h e n m e i s t e r]
z u H a l l e .

V o n n e w e n v b e r s e h e n , g e m e h r e t v n d
g e b e s s e r t .

Small Svo. A to E in eights. No pagination. No date. Title red and black. No table of contents or index.

On Evij. verso, immediately after the text, is the colophon:—

G e d r u e c k t z u F r a n c k f u r t a n d e r O -
d e r , d u r c h N i c o l a u m V o l t z e n , J n
v o r l e g u n g N i c k e l N e r l i c h .

This edition agrees with that of 1590 in containing the additional receipts. The dedication is reprinted.

It may be remarked that the various editions appeared at different places or by different printers.

52. In the dedication of the book to his friend and patron

aforesaid, Helmreich, like Boltz, indulges in the laudation of the arts and of the skill of workers, which is not only a divine gift, but which has divine sanction, as he illustrates by the example of Bezaleel and Aholiab and Hiram of Tyre. After expounding this topic he adds that he too had found pleasure in pursuing the art of colouring and of etching on metals, on armour and on weapons, as opportunity offered, and had brought the subject into order in a little book, together with what more especially belonged to pen-writing, with which he was every day occupied. This manual he had published (urged thereto by many friends, although he had for certain reasons refrained for a long time from complying) with no other object than to oblige his friend and well-wisher and put it out under his name, begging him to accept the small compliment, and to be gratified with the great diligence exhibited by him in it.

53. Helmreich's book runs almost parallel with that of Boltz, but with a different purpose. For whereas Boltz treats of painting and illumination and hair pencils, Helmreich deals with inks and quills, and there is not so much in common as one might expect.

54. The *Kunstbüchlin* is in four divisions.

- 1° Black ink.
- 2° Coloured inks.
- 3° Preparation of metals for writing.
- 4° Etching on marble and metals.

Under these heads are also some miscellaneous receipts.

55. In the first division the author describes the materials for black ink: galls, copperas, gum arabic, vinegar, urine, salt, alum, stale or stagnant water, and then follow certain curious directions, one or two of which are a little superstitious. The essentials are galls, copperas, gum and water, along with one or more of the others; but the details of preparation are different, as well as the time spent upon them. Helmreich goes into this minutely and discusses the uses and merits of the constituents and of the products. It is noteworthy that none of the processes correspond exactly with those contained in the *Kunstbüchlin* of 1537.

56. The second division is concerned with coloured inks which also are different from the earlier preparations, though the materials are pretty much the same.

For red ink digest Brazil-wood in beer or wine; let it stand

over night and "in the morning when the sky is beautiful and clear,"²⁴ boil it to half its bulk. Then add alum, and gum arabic, stir and boil again, allow to cool, strain and you will get a fine red ink. But, if you want it to be brown, add a little chalk when it is boiled, but take care it does not run over.

This receipt is not in Boltz's form, but the reference to the clear sky and to the effervescence points either to a common source or to Helmreich having transferred it from Boltz after his own fashion. Another red colour is got from cinnabar, but he does not say how cinnabar is to be made, but only how it is to be tempered. The other colours are briefly treated. The yellows are orpiment and lead yellow, which are pigments and not true inks; blue, azure; white, white lead; green, bilberry juice and alum, ground with verdigris and tempered with gum water; nightshade leaves, or rue, also afforded a green colour.

A few paragraphs are devoted to the colouring of parchment and paper.

The parchment was nailed out on a smooth board with the hair side outwards, and the colour was spread upon it. For black was used pine or rosin soot tempered with gum tragacanth and thin glue; for yellow, buckthorn berries with gum arabic, or with vinegar and alum; for red, Brazil-wood extract; for green, verdigris ground with buckthorn juice; or berggrün²⁵ and verdigris with glue water, or buckthorn and bruised daisies; for blue, azure in pure thin glue, or bilberries with alum, tempered with thin alum water; for brown, Brazil extract and white vitriol, tempered with a little gum arabic. Afterwards the parchment or paper should be gone over with thin varnish.

The dyeing of feathers is carried out with the same colours and in almost the same way as prescribed by Boltz. For black the feathers are cleaned, steeped in alum water, allowed to dry and treated with galls, and walnut shells and white of egg. The process as given is rather elaborate. For green, verdigris and salammoniac in a copper vessel with vinegar were used, the feathers being turned round and round in the colour. The feathers, prepared with alum, were immersed in Brazil colour

²⁴ See §38 above.

²⁵ This seems to be *chrysocolle*, copper silicate.

to make them red; for brown, white vitriol was added, and for yellow, buckthorn berries were employed.

After they are coloured and thoroughly dry the feathers should be varnished.

57. The third division describes the mode of preparing the metals for writing with a pen.

For this purpose a quantity of common salt was fused and allowed to cool. Then the metal was ground with a portion of it along with gum water and a few drops of virgin honey, transferred to a mussel shell and the salt washed away with warm water and afterwards cleared with spring water till the metallic particles lay bright and shining at the bottom. The metal was then tempered with thin gum. When the writing was dry it was polished with a tooth. This was the method with gold and silver, and with brass powder obtained from the brassfounder. As for copper, tin, steel and iron, they were filed as fine as possible, sifted and ground with common salt and gum as before. Bismuth was also employed.

58. Directions are given for making pure gum arabic water, and for the purification of saltpetre. This was effected by fusion and skimming off the impurities with a stick. The author adds that when the saltpetre is set on the fire great care must be taken, for it is not without danger. This fused nitre was ground with gold leaf for some hours so as to crush and break up the gold, after which the gold was washed from one vessel to another and finally preserved in a mussel shell to be used as required and tempered not with gum but with Rörenwasser.²⁶

59. There is a "water" which reduces all metals to a powder fit for writing with. It was made with salt, salammoniae, sal alkali, verdigris, feather alum, green vitriol and alum, ground to a fine powder, urine poured on and the whole allowed to stand for nine days in a vessel closed with wax. The water becomes of a fine green colour, it is decanted off, and when a metal is put in it it falls to powder. The powder is washed, tempered with gum and used. It shines like a mirror. But one does not quite follow the process or the action of the liquid.

The metals so prepared, mixed with very strong gum tragacanth, are used for writing on wood.

For laying gold or silver on glass or harness, not gum, but

²⁶ Conduit or pipe water?

aqua fortis mixed with the juice prepared from cherry blossom, must be employed.

60. Other receipts relate to foundations for gold and silver, as in the gilding of books, and consist of various gums. The mixtures are empirical and involve no chemical action.

Characteristic of the author's own needs are the receipts for making green and red sealingwax, the proportions varying for winter and summer. The materials were wax, turpentine, olive oil and verdigris. Red wax was similar, but contained cinnabar.

61. Another requisite for an accountant was a note book, or tablet, on which he could write and reckon. It was made by burning the leg bones of sheep to an ash, grinding it fine, mixing it with warm thin glue and spreading it on parchment. It could be made yellow with saffron and covered with thin Danzig varnish.

62. The fourth division relates to etching and the first receipt is to etch on marble. It is notable as an example of a process empirically successful, without any knowledge of the materials and actions involved.

Lapis emenditis (the very name is inaccurate), a red hard stone, is steeped in aqua fortis, broken down in a mortar, ground to dust on a hard stone and levigated. When the powder is dry it is rubbed up with linseed oil and a few drops of varnish, and it is written with on the marble. It is dried on a stove till it is quite hard. The stone has a border of yellow wax put round it; aqua fortis and vinegar in equal proportions are poured on, and the stone "boils." When the liquid is run off, the stone is examined to see if it has gone deep enough. It takes about an hour or more. It is not said how the writing paste was to be removed so as to leave the characters in relief.

Another mixture for writing with was levigated massicot, ground with linseed oil. This was used for metals, copper, tin or brass, and the etching liquid was a mixture of alum, verdigris, salt and saltpetre ground to powder with sharp vinegar and poured on the metal.

Etching on iron or steel, on armour and weapons, was a more elaborate affair, so as to get a good result. The writing liquid was the same, but the etching liquid consisted of verdigris, white vitriol, sal ammoniac, corrosive sublimate and saltpetre mixed with sour beer. After standing for a night it was poured warm upon the steel, until it had corroded it sufficiently, after which

the metal was washed, treated with quick lime and rubbed. The yellow colour was removed by fat or tallow, and the plate carefully cleaned.

63. Elaborate directions are given for gilding on iron and steel. A "goldwater" was made from copperas, alum, white vitriol, feather alum, sal gem, and common salt, but the author seems to have omitted verdigris. With this water the metal was inscribed, when it became of a copper colour. The red portions were treated with mercury, and the gold was laid on the mercury, and pressed down, and the object heated to volatilize the mercury. Afterwards it was cleaned very carefully and the steel heated till it had a fine blue colour.

The other method of etching is also described. The metal was coated with wax, the writing or drawing cut through it with a sharp point and aqua fortis poured on. Other ways of gilding and etching are described, but the materials are pretty much the same.

Silvering on copper or brass was effected by spongy silver precipitated from the nitrate.

The concluding paragraphs contain methods for making fine glue.

64. Not very many of Helmreich's receipts occur in the earlier books, but a few are to be found in *Ettliche Künste* of 1563, and two or three resemble corresponding receipts in Boltz's *Illuminirbuch*.

III. CAROLUS BATIN OR BATTUS.

65. In the third Supplement²⁷ to my "Notes on Books of Receipts," reference was made to a collection in Dutch of which two editions were quoted, one dated 1601, in the British Museum, the other dated 1609, in my own possession; the earlier one anonymous, the other with the name Carel Batin, respecting whom I had at the time no information. Although the contents were rehearsed pretty fully, it was not observed that certain sections corresponded to some of those in the *Rechter Gebrenck d'Alchimiei*, described in 1886. The Dutch book, however,

²⁷ *Transactions of the Glasgow Archaeological Society*, 1898, III. p. 306 (Reprint 1898, Supp. III. pp. 39-40).

included so much more that the receipts in question were lost sight of. Recently I got another Dutch collection, which, as it was nominally by a different author, I did not at first recognize. Examination, however, proved that it was another edition of the book which had been described as Batin's, and this led to a comparison of its contents with those of the other members of the series which have been so long under review.

66. In this last edition the author was called Carolus Battus, which afforded a fresh clue, as this name occurs in some of the biographical dictionaries, though not much is said about its owner. What the reason was for this change of name is not explained, but, so far as he is concerned, it has had the effect of making him the theme of biographies which do not tally so well as could be desired and which leave some important matters in doubt, more particularly his parentage.

67. According to Jöcher²⁸ he was a son of Bartholomæus Battus, and therefore a brother of Levinus Battus, a physician and chemist, who practised medicine at Antwerp, Hamburg and Dordrecht towards the close of the sixteenth century, and wrote an epistle included in the *Miscellanea* of Henricus Smetius, his cousin-german if Jöcher be correct, besides medical and chirurgical works, including the book of Secrets.

This is repeated by Panckoucke,²⁹ but the relationship with Bartholomæus Battus is not confirmed or even referred to by any authority I have been able to consult.

68. Indeed when the amount of his contributions to medical literature is considered, it is remarkable how his name has been passed over by writers from whom one would have looked for information. He is omitted by Adamus,³⁰ by Andreas,³¹ by Stolle,³² and by Manget.³³ Only the "Epistole" are quoted by Van der Linden,³⁴ and Mercklin,³⁵ omitting Carolus

²⁸ *Allgemeines Gelehrten-Lexicon*, Leipzig, 1750, i. 855.

²⁹ *Biographie Médicale*, Paris, 1820, ii. p. 35.

³⁰ *Vite Germanorum Medicorum*, Haidelbergæ, 1620.

³¹ *Bibliotheca Belgica*, Lovanii, 1643.

³² *Anleitung zur Historie der Medicinischen Gelahrtheit*, Jena, 1731.

³³ *Bibliotheca Scriptorum Medicorum*, Genevæ, 1731.

³⁴ *De Scriptis Medicis libri duo*, Amstelredam, 1637, p. 94.

³⁵ *Lindenius renovatus*, Norimbergæ, 1686, p. 206.

altogether, assigns them to Conradus Battus, a son of Levinus above mentioned. Zedler ³⁶ mentions him, but supplies no dates and no parentage. Paquot ³⁷ calls him a Flemish writer of the sixteenth century, "unknown to our book-sellers," who was "Médecin ordinaire" of Dordrecht in 1593 and 1598, and who translated several medical and chirurgical books into Dutch from French and German, of which he enumerates five with their editions. Van der Aa ³⁸ calls him a Netherlander, who was town physician (Stads Geneesheer) at Dordrecht from 1593 to 1598 (which is different from Paquot), and who translated numerous medical works into Dutch, of which a list is given.

69. The most recent account is that by Ph. Blommaert, ³⁹ which supplies some additional information. He is entered under the name Baten, not Battus, and is said to have been born at Ghent in the middle of the sixteenth century. On the arrival of the Duke of Alba, he, sharing the reformed views, quitted the country and did not return till after the troubles were over. Then on his appointment as town physician of Dordrecht he settled there and became highly esteemed.

70. In none of these is there any mention of his parentage or account of his early life or education, though they all agree in stating that he was a physician at Dordrecht, but we are not left entirely without a notice of it. The following thesis is extant:—⁴⁰

Propositiones de Morbo Gallico, de quibus
Doctore Henrico Brouceo Præside, respon-
debit pro gradu licentiæ, Carolus Battus.
Disputabitur autem die. Septembris
in auditorio maiori. 1569.
Rostochii in officina Jacobi Lucii.

Small 8vo. A in eights: no pagination. Printed in italics.

³⁶ *Grosses Universal Lexicon*, Halle u. Leipzig, 1733, iii. col. 722.

³⁷ *Mémoires pour servir à l'Histoire littéraire des dix-sept Provinces des Pays-Bas* . . . Louvain, 1763-70, ii. (1768) p. 671.

³⁸ *Biographisch Woordenboek der Nederlanden*, Haarlem, 1853, ii. i. p. 176.

³⁹ *Biographie Nationale publiée par l'Académie Royale des Sciences, des lettres et des Beaux-Arts de Belgique*, Bruxelles, 1866, i. cols. 772-773.

⁴⁰ British Museum, 1179, a. 2. (1.). The only authorities who mention this thesis, so far as I have observed, are Panckoucke and Van der Aa.

A1 title, verso blank.

A2-8 recto, Propositiones, 50 in all.

A8 verso, blank.

71. From this it may be inferred that on the arrival in 1567 of the Duke of Alba as Governor of the Netherlands, Carolus Battus, when he left, removed to Rostock, studied at the University there, and graduated in medicine in 1569. Assuming that he was then twenty-one years of age, the year of his birth would be 1548. He may, however, have been younger when he graduated.

72. For some time he pursued "chymistry" and "chymical" medicine, but when he saw that others, much more proficient than himself, could do no better than the ordinary physician, he turned from it and went back to the Hippocratic methods. After settling in Dordrecht he devoted himself to practice and to writing and translating medical and surgical works. An enumeration of these would be out of place here, but there may be mentioned, as illustrating his literary diligence and the success of his works, which were in considerable demand if one may judge by the number of their editions, the following treatises.

Wirtsing's Work on Medicine :

Guillemeau's Works on Surgery and Ophthalmology :

The Surgical Works of Ambrose Paré :

Manual of Surgery in Dutch :

Gabelkhofer's Book of Physick.

73. Lists of these works, more or less full, will be found in the notices of Battus already referred to by Jocher, Panckoucke, Van der Aa, Blommaert, and especially in the Surgeon-General's Catalogue.⁴¹

Two or three of the books were translated into English.

Besides these writings, which are professional, there are a few others which are curiously divergent from his regular studies, and which on that account may merit some notice.

74. After printing his thesis in 1569, he seems to have done nothing more until 1592, of which year there is assigned to him a translation from the German of the life and fate of Faustus. As this is a little volume of great rarity, and of some interest

⁴¹ *Index Catalogue of the Library of the Surgeon-General's Office, U.S. Army*, Washington, 1880, I. 805. Second Series, 1897, II. 152.

and curiosity as well, it may be described.⁴² The title is as follows:—

Warachtighe Historie van Doctor
Iohannes Faustus, die eenen wtne-
menden grooten Toouenaer en Swart-
Constenaer was, . . . Ouergheset wt
de Hoochduytsche Sprake doer
Carol. B. Medic. . . . [Vignette]
. . . . An. M. D. XCII.

Small 8vo, ff. [2] 59 Register [2], the printer to the reader [1]. Black letter. A few wood-cuts in the text. The vignette depicts a man, in biretta and gown, standing beside rocks over which flames are playing, while flames are issuing also from various parts of his person and clothing. It has nothing to do with Faustus, but in reality represents Pliny at Vesuvius, and in that connection it will be found in Boastnau's *Histoires Prodigieuses*, Lyon, 1574, 16°, 1. f. 41. The vignette so closely resembles that earlier print that one might almost believe that the same block had been used for both books, but comparison reveals minute variations. Though as like each other as may be, they are not identical.

75. It will be observed that the translator's name is only suggested, though it suits Battus quite well, and that both the printer's name and the place of publication are omitted. There may have been a reason for this. The printer in his concluding address to the reader, while holding up Faustus as the most unlucky of mortals in spite of his lucky name, and as a warning to flee from the devil and all his works, buttressing his exhortations with quotations from St. Paul, happens to allude to "these two renowned men of God, Dr. Martinus Lutherus and Philippus Melanchthon." Considering the times it was on the whole prudent on his part not to say anything about himself or his

⁴² British Museum, 8630, aa. 7. I have not seen the original German, but a late French version is extant with the following title: *Histoire | Prodigieuse et Lamentable | de | Jean Fauste, | Grand | Magicien, | Avec son Testament, | et sa vie Epouvantable. | A Cologne, | Chez les Héritiers de Pierre Marteau. | M.D. CC. XII. | 12mo, pp. 209 [6, 1 blank].* The frontispiece (included in the pagination) represents Faust within a magic circle encompassed by demons and monstrosities, on the watch for him to come out. He looks at his wit's end and rather unhappy. The scene is laid in a wood.

press. Considering too that Carolus Battus was a "partisan of the new views," the printer may have secured him as the translator, though there is always the possibility that it was some other Carol. B. Medic. who was the translator. That, however, is not probable.

76. Another treatise was written by him, also on a topic apart from his usual pursuits, namely on the soul of man and its immortality and the difference between it and that of irrational animals, a position which would find numerous assailants at the present day. I have not had the fortune to see a copy of the book, which is probably not without interest. The title, as quoted by Blommaert,⁴³ is as follows. I have not seen it referred to by anyone else.

Van de ziele des menschen, ende van de onsterffelickheydt des menschen ziele. Waerin door vele natuerlike redenen ende sterke argumenten, door diverse scribe schriften der philosophen, sommigen oud-vaderen bewesen, ende door de H. Schrift gheconfirmeert wordt dat de ziele des menschen niet en is te vergelycken met de ziele der onvernunftige dieren, dat oock de ziele des menschen onsterffelic ende onverganekele is.

Tot Dortrecht, by Alex. Camin, 1601 : in 8vo.

77. Reserving the "Secreet-boeck" for special notice, reference may be made to the letter which he wrote against Dr. Josephus Michelius, a notable Paracelsian, which appeared in the collection made by Henricus Smetius.

Miscellanea Henrici Smetii . . . medica
Cum præstantissimis quinque Medicis
. . . communicata, et in Libros XII.
digesta . . .

Anno MDCXI.

Impensis Jone Rhodii, . . . Francofurti . . .
8vo.

Books V. and VI. treat of Paracelsus and his opponents. Book XII. contains twenty-two letters about Paracelsus, which passed between Levinus Battus, at Rostock, above mentioned,

⁴³ *Biographie Nationale . . . de Belgique*, Bruxelles, 1866, t. col. 773.

and Smetius at Heidelberg. There is a notice of Paracelsus' life and his cure for epilepsy, and Smetius makes a reply to the arguments against the "chymists'" artificial gold.

Here also is the letter of Carolus Battus mentioned above, and one from Petrus Severinus, who was a Paracelsian.

78. There is no indication of the date of his death, but he seems to have lived to an advanced age. Even admitting that such was the case it is difficult to believe that, if he was born about 1550, he saw the publication of his translation of the works of Ambrose Paré in 1636. Still less could he have seen the editions of his own works subsequent to that date. They must have been merely reprints under some other person's supervision.

79. Regarding his parentage it may be useful to summarize the arguments for and against Carolus Battus being a son of Bartholomeus Battus.

The facts which may be quoted in support of Jocher's statement are these.

He was born at Ghent in the middle of the sixteenth century.

He left Ghent on account of the religious troubles in 1567, when the Duke of Alba arrived as governor of the Netherlands.

He went to Rostock and graduated in 1569.

A letter by him was printed by Smetius, assigned erroneously to Conradus Battus, by Mereclin.

There is no great weight in these facts, but their pertinency depends upon their dates and upon their cumulative effect. As few dates are given by the chroniclers, one must fall back upon inferences.

80. Bartholomeus Battus was born at Alost about 1515, and died in January, 1558,⁴⁴ when he was presumably 43 years of age. He had a family of nine children, and he may have been married when he was five and twenty, or perhaps even younger. His book, published in August, 1558, was dedicated to his sons Peter, Joannes and Levinus, who was born in 1545. Assuming that these sons are in order of seniority, the eldest may have been

⁴⁴ Eugène Coemans (*Biographie Nationale . . . de Belgique*, Brux. 1866, t. 772) points out the incompatibility of this date with 26th August, 1558, the date of the dedication of his book. But he has forgotten that at this time the year was reckoned from March. It would save confusion in the present case to write the date as 1558/9.

born in 1541, the second in 1543, and Levinus in 1545. On account of his religious views he was imprisoned for nine months, was liberated and removed to Ghent, where he lived for ten years, and then on account of a threat of renewed persecution he travelled to Rostock in 1556, where he died two years later. There is no evidence of the date of his imprisonment, but from the figures now given it must have been in 1543 or 1544, and he settled in Ghent about 1545.

81. Levinus,⁴⁵ his son, was born at Ghent in 1545. After his schooling and two years in Antwerp studying mathematics, he followed his father to Rostock, spent a couple of years there, went to Wittenberg to hear Melancthon and graduated in 1559, aged fourteen. His father was then dead.

82. What bearing has this on Carolus Battus? He was born at Ghent, left it in 1567, and graduated in medicine at Rostock in 1569. If, like Levinus, he graduated when he was fourteen, he would be born in Ghent in 1555, and might have had Bartholomæus for his father. If so his father had been dead for ten years when he took his degree. He may, however, have been a few years older when he was licensed in medicine.

His residence at Rostock may have been decided by its having been chosen years before by Bartholomæus, and by the Chair of Medicine being occupied by Levinus Battus. The epistle which Smetius included in his *Miscellanea* was accompanied in the same volume by others written by Levinus Battus, so that independently of their intrinsic value Smetius may, naturally enough as a relation, have aimed at giving them all the publicity in his power.

There is not much support in these remarks for Jocher's position, but they may suggest some relationship, if it is not so close as actual sonship.

83. The arguments against the relationship are entirely negative. No authority, except Jocher, affirms any connection, and the earlier biographers who are familiar with Bartholomæus Battus, Levinus his son, and Conradus his grandson, carefully avoid allusion to Carolus as a connection, if indeed they take any notice of him at all. The silence of Adamus on this question is

⁴⁵ Notices of Bartholomæus Battus (with his epitaph) and of Levinus Battus are contained in Paquot's *Mémoires*, 1768, II. pp. 669 and 670, and also in the *Biographie Nationale . . . de Belgique*, 1866, I. cols. 771 and 775.

perhaps the most significant against what Jöcher says. For he published his account of Levinus Battus and his cousin, Henricus Smetius, in 1620, when his personal memories of them were quite fresh, and when Carolus was probably—almost certainly—alive. Had Carolus been a brother of Levinus, he could not fail to have known it, and he could hardly have ignored his connection with Smetius when he was writing about him. That he did not do so indicates that if there was a family relationship it was not an immediate one. More recent writers take no notice of what Jöcher asserts and make no reference to the subject.

84. There is another difficulty. If Carolus was a son of Bartholomæus, born in 1548 or 1550, or any year prior to 1555, was he or was he not taken to Rostock by his parents? If taken, how long did he remain at Rostock, when and why did he leave it and return to the Netherlands, and how long was he there before 1567, when he left and returned to Rostock? All this, too, when he was little more than a child. If on the other hand his parents left him behind, which is quite improbable, judging by Bartholomæus' own doctrines about the mutual obligations of parents and children, the same problems can be propounded with even more force.

85. So far as I know there are no data for solving these difficulties. The simplest explanation seems to be that Carolus Battus was not a member of Bartholomæus' family, though he may have been connected with it. It does not explain, however, why, on his own merits, he was not recognized and duly appreciated by Adamus and the medical bibliographers.

SECREET-BOECK.

86. 1594. This collection of receipts seems to have been issued originally in two separate parts, at least two entries are given by van der Aa.⁴⁶ The first has the title:—

Het Secreet-boeck van boomen, planten, bloemen, kruiden,
en zaaden, van koecken, confyten, olyen.

Leeuwaarden, 1594. 12mo.

The second is as follows:—

Secreet-boeck van heerlijke konsten en veelerleij materien.
Leeuwaarden, 1594.

⁴⁶ *Biographisch Woordenboek der Nederlanden*, Haarlem 1853, II. i. p. 176.

Without having seen these books one cannot be sure, but judging from their contents, they were afterwards conjoined in one volume, the first part on Natural History corresponding to pp. 1-145, and the second on various arts, to pp. 146-356 in the edition of 1609, or to pp. 5-220, and pp. 221-573 in the edition of 1661. This, however, requires confirmation.

Only the first part about trees, flowers, etc., is quoted by Blommaert.⁴⁷

87. 1599. According to Panckoucke⁴⁸ there was a translation into English of the *Secreet-boek*, printed at London, 1599, 8vo.

88. 1601. The next edition of the *Secreet-Boeck* which I have seen is that of 1601. It is unnecessary to go into details about it, as I printed an account of it in 1898,⁴⁹ but the title and collation may be repeated.

Secreet-Boeck | waer in vele diverse Secre-
ten, ende herrlicke Consten in veelder leye
verscheyden materien, wt seker Latijnsche,
Fransoyse, Hoochduytsche, ende Nederlandt-
sche Authoren, te samen ende by een ghebracht
zijn: Waer van den meestendeel der voor-
schreven Authoren namen daer by gheciteert
worden. [Device.]

Tot Dordrecht. | By Abraham Canin, Int | Jaer
ons Heeren, 1601.

Small 8vo, A to Z in eights, A to D in eights, E one leaf: or 4 pp. prelim. and text, pp. 419, so numbered, but pp. 180-189 (inclusive) are numbered twice. Black letter. The device is a lion holding a book.

The preliminary pages contain title, privilege, and author's preface.

This copy is in the British Museum, 1036. c. 3. (2.).

⁴⁷ *Biographie Nationale . . . de Belgique*, Bruxelles, 1866, I. col. 773.

⁴⁸ *Biographie Médicale*, Paris, 1820, II. p. 35.

⁴⁹ *Transactions of the Archaeological Society*, Glasgow, 1898, N.S. III. 396. (Reprint, Supp. III. p. 39.)

89. 1609.

S e c r e e t - B o e c k

Waer in vele diverse Secretē,
 ende heerlicke Consten, in veelderleye
 verscheyden materien, wt seker Latijnsche, Fran-
 soysche, Hoochduytsche ende Nederlantsche Authoren, te
 samen ende by een gebracht zijn: Waer van den mee-
 stendeel der voorscheven Authoren namen
 daer by gheciteert worden.

By een vergadert door D. Doctor Carel Batia.

[Vignette.]

TOT DORDRECHT.

By Joris Waters. Anno. 1609.

Small 8vo. A to Z in eights; or pp. [4] 356 [7, 1 blank].
 Black letter: but the head-lines and section-titles are roman, and
 the paragraph titles are italic.

The vignette is a sea monster—a merman—blowing a conch,
 enclosed in a serpent, all within a border with the motto: *Studys*
Immortalitatem Acquirimus.

This edition was described at the same time as that of 1601.⁵⁰
 There is no copy in the British Museum.

90. 1631. Hendreich⁵¹ says that Battus published a book in
 Dutch, the title of which he gives as follows:—*Secret-boeck, seu*
De arcanis medicamentis quibusdam medicis, Amsterdam, 1634,
 8vo; Harlem, 1650, 8vo, and 1656, 12mo. Presumably this is
 the “*Secreet-boeck*.” The entry was copied by Zedler,⁵² but
 not by any other, so far as I have observed. I have not seen
 these editions.

⁵⁰ *Transactions, &c.*, Glasgow, 1898, N.S. III. 397. (Reprint, Supp. III.
 p. 40.)

⁵¹ *Pandecta Brandenburgica*, Berolini, 1699, fol. 57v.

⁵² *Grosses Universal-Lexicon*, Halle und Leipzig, 1733, III. 722.

91. 1650.

Secreet-Boeck

V a n v e l e d i v e r s c h e e n

Heerlicke Consten in veel-

derleye Materien,

Met veel Remedien teghen de

innerlijke en uytterlijke gebre-

ken der Menschen.

*Wt Latijnsche, Francoische, Hooghduytsche
ende Nederduytsche Autheuren vergadert.*

Door

C A R O L U M B A T T U M ,

Medicijn-Ordinaris der stadt

DORDRECHT.

Verrijckt met verscheyden Secreten van

Wijnen, Verwen ende Schrijf-Konsten.

[Ornament.]

t'AMSTERDAM,

Voor IOOST HARTGERSZ, Boeck-

verkooper op den Dam, bezijden het

Stadthuys, ANNO 1650.

12mo. A to Z, Aa, in twelves, Aa 11 and 12 are blank; or, pp. [1-4] 5-490 [2] 73 [4, 5 blank]. Black letter; but the title-page, Voor-Reden, head lines, section titles, table of contents, and names of authorities, are in roman. Pp. [1-4] contain the title-leaf and the author's preface: pp. 5-490, the text. The leaf following contains the title (in roman) of the appendix, dated 1651. The verso is blank. Pp. 1-73 contain the appendix, followed by the table of contents, pp. [1], and five blank pages

The contents of this edition are the same as those of 1661.

There is a copy in the British Museum, 1038. a. 12.

92. 1650. An edition of this year at Haarlem is mentioned. See 1634.

93. 16[5]6.

Secreet-Boeck

V a n v e e l e d i v e r s c h e
e n H e e r l i j k e K o n s t e n i n

veelderleye Materien,

M e t v e e l R e m e d i e n t e g h e n d e
i n n e r l i j k e e n u y t t e r l i j k e g e b r e -
k e n d e r M e n s c h e n .

*Wt Latijnsche, Francoische, Hooghduytsche
ende Nederduytsche Autheuren vergadert.*

Door

C A R O L U M B A T T U M ,

Medicijn-Ordinaris der stadt

DORDRECHT.

Verrijckt met verscheyden Secreten van
Wijnen, Verwen ende Schrijf-Konsten

[Device]

t'AMSTERDAM,

By Jan Wilting, Boeck-verkooper op de
Singel, by Jan Roonpoorts Tooren, 16[5]6.

12mo. A to Z, Aa, in twelves; or, pp. [1-4] 5-573, [3]. Black letter, but the title-page, Voor-Reden, head lines, titles of the sections, table of contents and names of authorities, are in roman. The device is a winged hour-glass, a skull and cross-bones lying on the top of it, all placed on the back of a tortoise, with the motto: MYN GLAS LOOPT RAS.

In the date the third figure is very faint, but it seems to be 5.

Pp. [1-4] contain the title and preface; pp. 5-573 contain the text; the appendix begins on p. 503, without a separate title-page; the contents occupy 3 pages at the end, and are identical with those in the 1661 edition.

Though the 1656 and 1661 editions agree page for page and line for line, the type in the latter is somewhat larger.

94. 1656. An edition of this year at Haarlem is mentioned.
See 1634.

95. 1661.

Secreet-Boeck

VAN veele diverse en Heer
lijke Konsten in veelderley

Materien,

Met veel Remedien tegen de in-
nerlijke en uytterlijke gebreken
der Menschen.

*Wt Latijnsche, Francoische, Hooghduytsche
ende Nederduytsche Auteurs vergaderd.*

Door

C A R O L U S B A T T U S

Medicijn-Ordinaris der stadt

DORDRECHT.

Verrijckt met verscheyden Secreten van
Wijnen, Verwen ende Schrijf-Konsten.

[Ornament]

t A M S T E R D A M.

Voor I. I. SCHIJPPIER, in't jaer
1661.

Small 12mo. A to Z, Aa, in twelves: or pp. 573 [3]. Black letter, including the section titles: but the title-page, preface, head lines, titles of the paragraphs and index are in roman.

96. 1664. *Secreet boeck van heerlyke Konsten in veelderley Materien.* Leenwaarden, 1664. Svo.

This edition is mentioned by Panckoucke.⁵² I have not seen it.

97. This is an extensive but rather miscellaneous gathering, and Battus has laid the leading secret-mongers under contribution, not always with discrimination. A considerable part of the book does not concern our subject, but he has included many receipts and processes which were already extant in the *Kunst-*

⁵² *Biographie Medicale*, Paris, 1820, II. p. 35.

büchlin, and others which are given by Boltz and Helmreich. A short enumeration of them will suffice to exhibit the connection between these books. The edition of Battus's work of 1661 as the latest known to me may be used for comparison.

98. The first two hundred pages or thereby treat of the elements, the body and mind, various diseases, beasts, insects, reptiles, fishes, birds, plants, and metals.

Then he deals with the metals, in particular copper, hardening and softening of iron and steel, etching upon them, the colouring of metals and laying one upon another, several of which are in the *Kunstbüchlin* of 1537.

A section which has been treated more fully than in most of the other books is that upon taking out spots and stains, for effecting which several of the receipts in the *Kunstbüchlin* have been copied.

99. Under the title of "The Secrets of Illumination and of making all sorts of colours," Battus has appropriated nearly the whole of Boltz's book, with the exception of the division about painting and shading and a receipt here and there, but Battus practically begins with tempering mediums, and ends with the receipt how to strengthen porous paper so as to keep colour from soaking through or running, just as Boltz does.

100. The foregoing receipts comprise all which are in the 1609 edition connected with the present subject, for those which come after relate to quite other topics, meteorology, cookery, distillation, the making of oils, balsams, and so forth. In the 1661 edition, however, there is an appendix which includes the making and preservation of wines, the preparation of colours and of inks, and the secrets of writing.

101. The receipts for colours correspond with those already described, as far at least as the materials are concerned, but the methods of preparation, though with points in common, indicate either a different source, or else considerable revision and extension of the older methods, besides some additions to the materials employed. Among the concluding paragraphs, however, are some which agree almost verbally with those in Boltz's manual, and some that are identical with those in the *Kunstbüchlin* of 1537 and the *Ettliche Künste* of 1563. The analogies will be best understood from a tabular arrangement which I hope to include in the next Supplement. Some receipts I have not succeeded in tracing to their probable sources.

IV. TINTENFASS.⁵⁴

102. There is no author's name to this work, "the well-appointed ink-horn," but there is a short preface to the edition of 1732, in which it is stated that the tract first appeared in the preceding year, 1731, and consisted of two sheets, presumably 32 pages, and that there was such a demand for it, and the copies were so speedily exhausted, that there was no alternative but to issue a new edition for those who wanted the book. In so doing, several approved ink receipts were added, as well as a number of necessary and useful hints, about the art of writing.

Since among so many receipts for ink-making as are given, it is not easy, the author remarks, to ascertain the best, those which have been proved by daily use to be the most agreeable and serviceable are indicated by the letters: N.B. The others are left for the trial and experience of those who are assiduous in calligraphy.

103. This preface is clear and satisfactory, but the writer of it, neither claiming nor disclaiming the authorship of a tract that supplied opportunely a popular want, is silent as to Helmreich's work on the same topic. I regret that I have not seen a copy of the 1731 edition of the *Tintenfass*, for it may have been a simple reprint of Helmreich's tract with the omission of the fourth division about etching and possibly of a few receipts not concerned strictly with writing.

104. The 1732 and subsequent editions which I have examined are certainly indebted to Helmreich's book, if indeed they are not to be called revised and extended versions of it, with the

⁵⁴ In the British Museum (785. a. 44.(3.)) there is another book on the same subject with an analogous title, as follows:—

Das | wohl und dauerhaftig | zubereitete | Dintenfass. |
 Die selbst lehrende | gründliche Schreibeschule, | und die
 leicht und deutliche | Anweisung, | wie eine Feder zu
 jeder Schrift nach und | nach zu schneiden und abzu-
 köpfen sey; | Item | wie die übrigen | Schreiberey-
 Materialien | wohl zubereitet werden müssen. |
 Leipzig, 1752. |

Svo. A. B. C. in eights, or pp. 48, with 3 folding leaves: how to make a pen, and how to use a proportional line leaf so as to make symmetrical writing.

So far as my comparison goes this is quite a different set of receipts from the others, though the materials used are necessarily the same.

omissions referred to, and it is a witness to the esteem in which Helmreich's book was held, that it should have been revived and enlarged and modernised as still suitable for a new generation.

105. The two editions, 1732 and 1792, are divided into ten chapters, the contents of which may be briefly summarized.

- I. The materials for making black ink.
- II. Different sorts of black ink.
- III. Coloured ink: red, green, blue, yellow.
- IV. Curious inks.
- V. Writing with gold, silver, and other metals.
- VI. Paper, parchment, and tablets.
- VII. Other materials to write upon.
- VIII. Quill pens and pen knives.
- IX. The correct posture in writing.
- X. Sealing wax, red and green.

It is to be observed that the subjects of Chapters IV., VII., VIII., and IX. are either not discussed by Helmreich at all or are referred to in a few isolated receipts. Besides these new chapters, quite new receipts are introduced in the others.

106. These remarks apply also to the edition of 1792, from which, by the way, the preface has been dropped, so that the book thus loses its history and assumes a modernity to which it has no title. It has the same ten chapters, but again fresh matter has been added, and various verbal changes can be detected, though there is no fundamental difference between it and its sixty year old predecessor. More remarkable, however, is the permanence of the receipts first printed by Helmreich in 1567, which form the basis of this treatise on the same subject in 1792. This persistence, however, may be due as much to there having been no substitute discovered for the gallo-tannate of iron than to Helmreich, or to either his predecessors or successors. In so far as Helmreich's receipts are connected with the earlier series, so these later repetitions naturally share the union.

107. The following is the title of the earliest edition I have seen: —

Das aufs neue
wohl zubereitete
T i n t e n - F a s s :
Oder
Anweisung,
Wie man gute schwartze, bunt-
färbige, auch andere curiose Tinten
auf mancherlei Weise zubereiten, auch wie
man mit Gold, Silber und andern Metallen aus
der Feder auf Pappier, Pergament und an-
dere Dinge schreiben solle :
nebst verschiedenen
Zur
S c h r e i b e r e i
gehörigen nöthigen und nützlichen
Stücken,
Deren Inhalt gleich nach der Vorrede zu finden :
Den der Schreiberei-Beflissenen zum Nutz und
Dienst mit Fleiss gesamlet, und zum Druck
befordert.
Helmstädt.
Zu finden im Buchladen. 1732.

Small 8vo. A, B, C in eights, D two leaves : or pp. [1-2]
3-52.

108. There are two issues of the "wohl zubereitete Tinten-Fass," Helmstädt, 1732, 8vo, which agree practically word for word and line for line so closely that it is not easy to give marks by which to discriminate between them.

The British Museum copy (8703. de. 36. (2.)) is on thicker and stiffer paper than mine. The commas in this copy are small, those in mine are long lines.

On each side of the page number (which is in the centre) there is a small ornament. That in the British Museum copy consists of four small leaves, or loops at right angles, linked together at the centre. Between each pair is a free line radiating from the centre. In my copy it consists of two small concentric circles ;

from the outer one radiate nine groups of lines. The two ornaments are quite dissimilar and are easily identified.

Various typographical differences might be pointed out, especially in the relative position of the signatures to the text in the two issues, which prove that the book was set up twice, at any rate.

109. The next edition is in the British Museum (T. 501. (1)).

Das aufs neue | wohl zuberitete | Tinten-Fass: |
oder, | Anweisung, | Wie man gute schwarze, buntfärbige, |
auch andere curiöse Tinten auf mancherlei | Weise
zubereiten, auch wie man mit Gold, Silber | und
andern Metallen aus der Feder auf Pappier, Per- |
gament und andere Dinge schreiben | soll: | Nebst noch
andern | zur | Schreiberei | gehörigen nöhtigen und
nützlichen Stücken. | [Vignette]

Dritte vermehrte und verbesserte Auflage. |
Helmstädt, | Zu finden im Buchladen. 1733. |

Small 8vo. A to D in eights; or pp. 64.

The vignette is an inkbottle with a quill pen in it. This edition contains a number of receipts not in the previous editions, but the others are repeated without change.

110. The "Tintenfass" seems to have had as great an initial success as Boltz's manual, for this is the fourth issue within three years. When one recalls the skill and practice required for making a quill pen, long before the iridium-pointed gold pen was dreamt of, or the fountain-pen, a revived invention of the eighteenth century, was introduced, and remembers the attitudes assumed by untrained youth in their early attempts at "putting pen to paper," which had to be corrected, the writing masters of a hundred and fifty years ago may have made their pupils buy this book in order to study the eighth and ninth chapters, and so exhausted the editions. Be that as it may, the demand in this case also seems to have suddenly ceased, for there was nothing more of the book till 1792, and when it did appear it was under a new name. If there were editions in the sixty years' interval, which is not unlikely, not a sign of one has come before me. They may, however, have been published under other names, in which case only chance might bring them to one's acquaintance.

111. The 1792 edition has the following title:—

Geheimnisse,
aller
A r t e n T i n t e n
zu machen,
und
mit Muscheln, Gold und Silber
zu schreiben.
[Ornament.]
Leipzig und Altona,
bey J. H. Kaven, 1792.

Small 8vo. A to D in eights. D 8 is blank: or pp. [1-3] 1-62
[2 blank] Ornamental head- and tail-piece.

112. It is not necessary to enter into an examination of this book for the more important parts, the materials and methods, have been discussed already under *Helmreich*. As for the chapters about writing they are apart from the present subject.

V. FLECKENKÜNSTLER.

113. The last of the books which I have to refer to is "*Der Fleckenkünstler*." The author's name is not indicated, and the edition to be described is the only one known to me at present. There may be others which I have failed to observe. Its title is as follows:—

Der
vollkommene
F l e c k e n k ü n s t l e r ;
eine Anweisung
alle Fett Rost-Dinten-und andere Flecken
aus
Gold und silbernen Stücken, und seidenem Zeuge, Sammet,
Scharlach und anderen Tüchern, wie auch aus Papier
herauszubringen
nebst
vielen bisher geheim gehaltenen Künsten von
Farben und Firnissen.
bei Tobias Loeffler in Mannheim
1797.

Small 8vo. A to D in eights, E seven leaves: or pp. [2] 78. E 8 has been used for the title-leaf, cut off, and pasted on in front.

114. The title: *Der vollkommene Fleckenkünstler*, or, "The Accomplished Smudge-Artist," is rather a misnomer, for while the first sixteen pages describe methods for removing spots and stains from a variety of fabrics, the remaining four-fifths of the tract are occupied with cures for diseases, with colours and varnishes, with inks, with metal-work, with destruction of vermin, general and personal, and with a lot of miscellaneous receipts. The compiler, whoever he was, had no thought or care for his reader, for he has not arranged his receipts, say 190 all told, systematically, and he has not compensated for this defect by an alphabetical index, or even by a table of contents.

Of these receipts most are of comparatively late origin, but a number are extant in the older collections.

115. Of the first section about removing spots and stains, not one is taken from the earlier works, or corresponds to any which were reproduced in Supplement IV. The substances used, however, were effective enough, Venice soap, almond soap, ashes, salt of tartar, and these causticized with quick lime, but some are included of which the detergent properties are not obvious.

These are succeeded by the treatment of various diseases, both of men and cattle, which is empirical and sympathetic and useless; then come cements for broken pottery, next the destruction of vermin, in the middle of which receipts are introduced for black ink. The first is one marked N.B. in the *Tinten-floss* of 1732, so that it has probably been copied from that book. There is a resemblance in one or two others, but it is not conclusive as to copying. A method for feeding horses and cattle economically, one to destroy field mice, and a cure for epilepsy, are followed by three receipts to make tempering waters for illuminating, taken almost verbatim from Boltz, along with those about isinglass, gum tragacanth, and varnish for parchment. Several others are added which do not occur in the older books. Receipts for colours: purple, rose-red, green, have been already quoted. The concluding paragraphs deal with a variety of topics. One is to draw the green colour from copper, so that "it will never be green again, but remains permanently white," a statement which gives a glimpse of ideas, old ones, which were still current at the end of the 18th century: but another is to whiten it by treatment with arsenic. The process is given in detail. Varnishes, oil colours, gilding, silvering and coppering of earthenware and etching upon iron

are described briefly. The etching agents and the methods are similar to those already referred to.

The *Fleckenkünstler* is a poor higgledy-piggledy production, and, except that it contains excerpts from books two hundred and fifty years old, would not have been included in the present lists.



UNIVERSITY OF CALIFORNIA LIBRARY
Los Angeles

This book is DUE on the last date stamped below.

CHARGE-URL

DE

JUN 2 1979

JUN 1 1979

Z
5524 Ferguson -
A35F3s Some early
treatises on
technological chemistry

LIBRARY

Z
5524
A35F3s

UCLA-Young Research Library

Z5524.A35 F3s

yr



L 009 522 047 1

UC SOUTHERN REGIONAL LIBRARY FACILITY



AA 001 239 488 8

